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Cultural Resources Overview

Mt. Taylor Area, New Mexico
Joseph A. Tainter and David "A" Gillio



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CULTURAL RESOURCES OVERVIEW, MT. TAYLOR AREA, NEW MEXICO

by

Joseph A. Tainter

David "A" Gillio

For

Cibola National Forest
Albuquerque District Bureau of Land Management
Socorro District Bureau of Land Management

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PREFACE

This volume is the third to be published in a continuing series of Cultural Resource Overviews resulting from our cooperation in the administration of cultural resources. This study of the Mt. Taylor area joins Dr. Cordell's overview of the Middle Rio Grande Valley and Ms. Berman's overview of Socorro and Catron counties in bringing together what is known about New Mexico's heritage.

Protection, study, and enhancement of a wide spectrum of cultural resources on Forests and public domain is an important responsibility of the USDA Forest Service and the Bureau of Land Management. Production of these overviews, summary statements of what is already known about those resources, represents an important step toward acquiring the capability to manage the resource.

These volumes were born of the necessity for cultural resources baseline data which

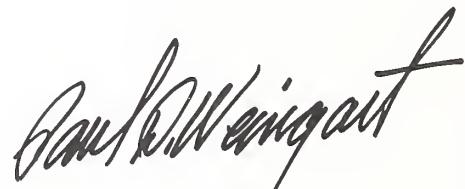
are important in the formulation of land use plans. We are pleased to find that they are also welcomed by the professional community for their utility in teaching and for further study of the area. The interested public also benefits from the summarization of many sources which are not widely available.

Various approaches are being used to assemble knowledgeable authors for this series. Some areas will be described by professionals from the academic world who successfully bid for contracts; others result from the work of scholars who accept temporary employment under authority of the Intergovernmental Personnel Act. Unlike the earlier overviews, this study was completed by members of the Forest Service family.

We take pleasure in making this third volume of the series available to the public and to the professional community.

M Marvin Le Noue

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INTRODUCTION

PURPOSES OF THE OVERVIEW

With the expansion in recent years of federal support for the conservation of cultural resources, many federal agencies have come to grips with the problem of managing archeological and historical sites on the lands under their jurisdiction. One part of this problem is that land managers often do not know what kinds of cultural resources are present on their lands, nor what these signify. The joint Cultural Resources Overview program of the USDA Forest Service (Southwestern Region) and the USDI Bureau of Land Management (Arizona and New Mexico State Offices) is designed to fill this gap, to the extent that current information allows. To this end, the overviews provide a compilation and synthesis of all known information about the prehistory and history of different areas.

Although initiated to serve the needs of land management planning, at the same time the overviews provide an opportunity for archeologists to acquire professional quality, up-to-date syntheses of the human occupation of overview areas. This should be a most welcome undertaking. Thus, these overviews are intended to be read and used by a variety of audiences.

Since this kind of synthesis is often a monumental task, the Southwest has been subdivided into subareas, each of which is to be treated separately (see Map 1). These individual studies will then be synthesized into statewide overviews. The present document deals with the Mt. Taylor area of west-central New Mexico (Maps 2, 3, and 4). It has been prepared for the Mt. Taylor District of the Cibola National Forest, and for the Albuquerque and Socorro districts of the Bureau of Land Management.

SCOPE OF THE OVERVIEW

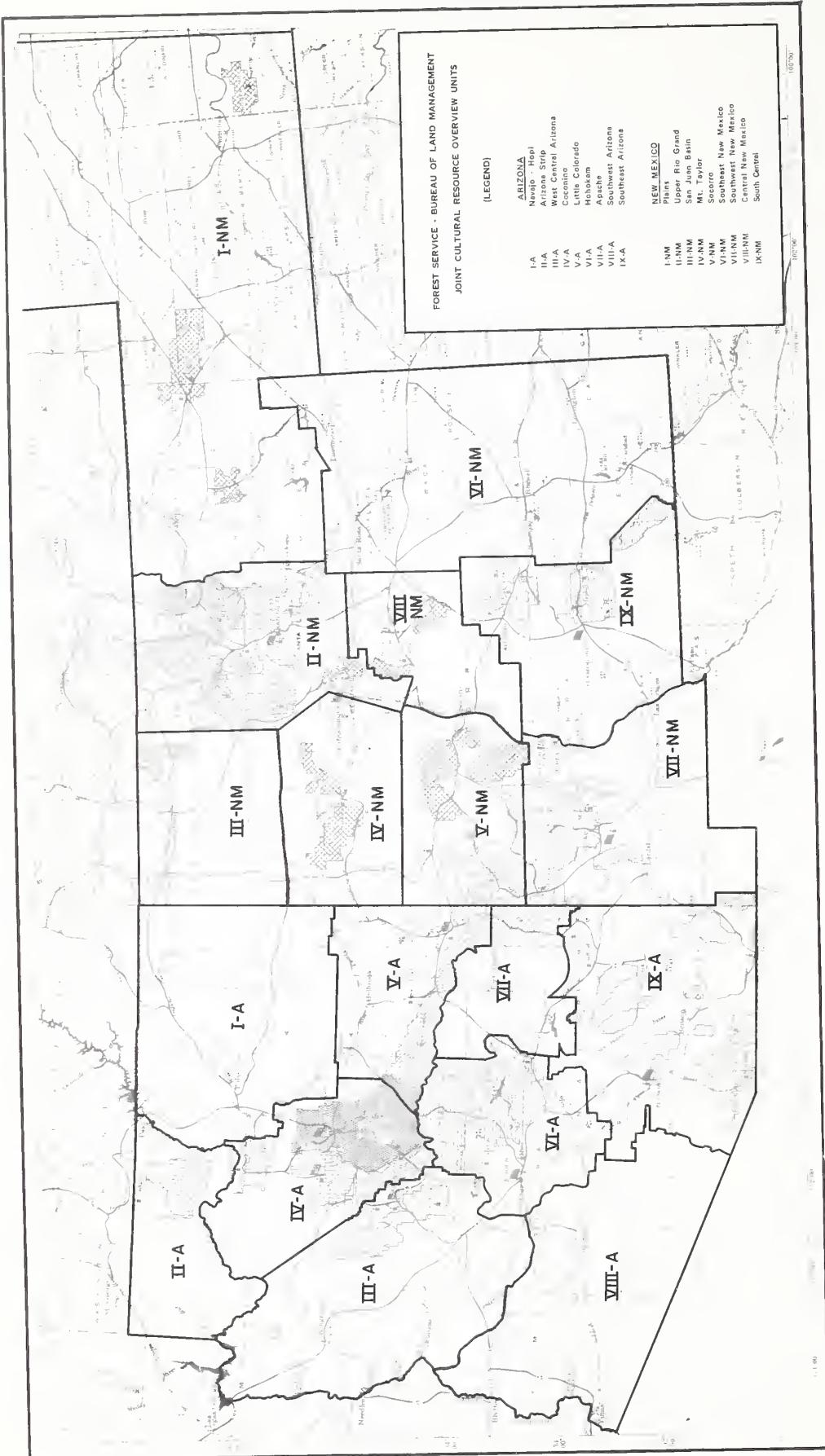
There is a simple division of labor in the present overview. This introduction, the chapters offering a conceptual framework and a history of research, the chapters describing and synthesizing prehistoric cultural resources, and the concluding management chapter, were written by Joseph Tainter. The chapter detailing the history

of the area was prepared by David Gillio. This division of tasks proved to be most satisfactory, for Gillio specializes in historical archeology and has written such syntheses before, while the present author is basically a prehistorian. I should caution that this introduction was largely written to serve the portions of the overview that I have authored. Dr. Gillio will have some introductory remarks for his section.

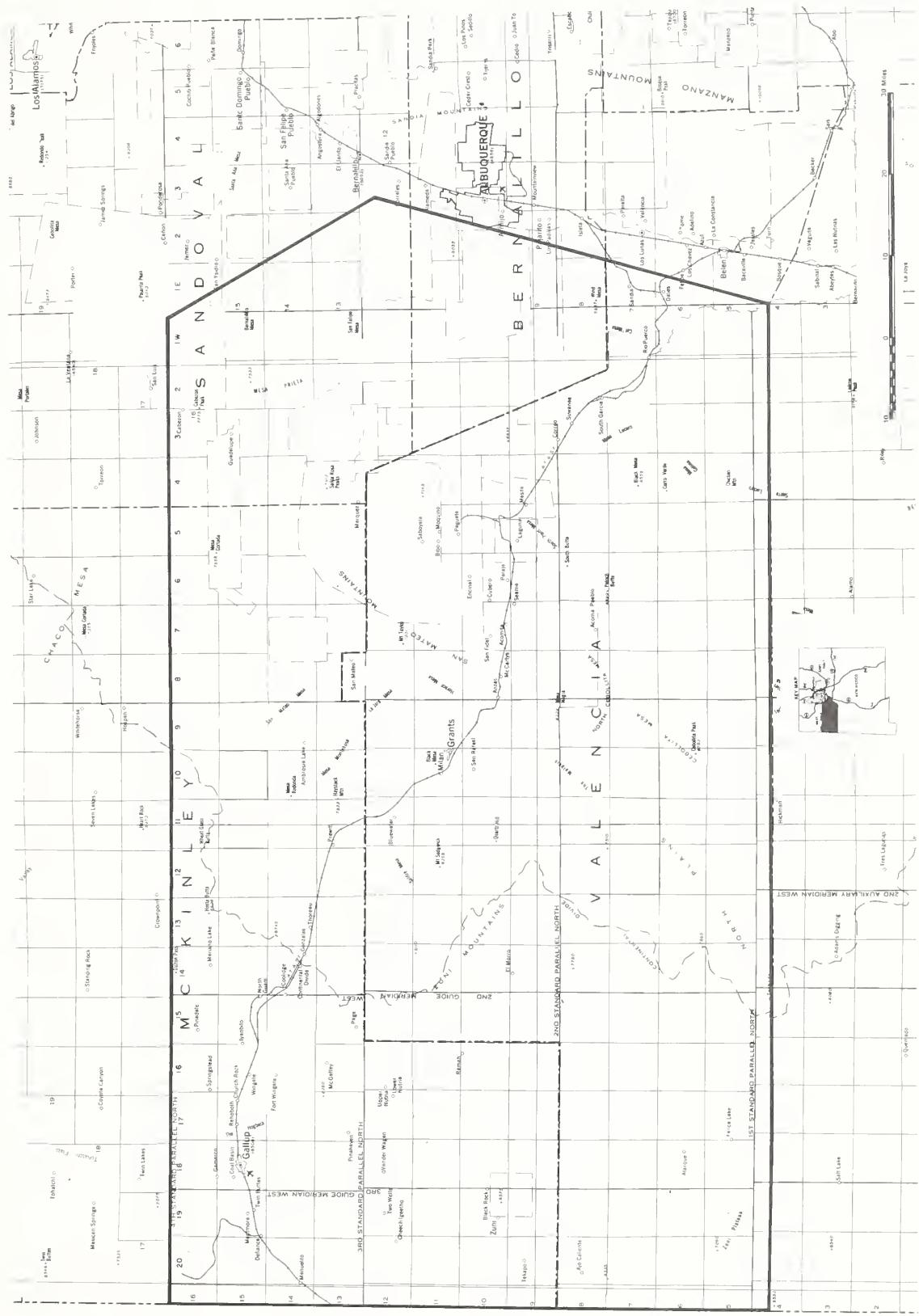
Since this document is meant to be used by land managers as well as professional archeologists and historians, it was necessary to strike a balance in writing. To do this, Gillio and I have attempted to minimize the use of specialized terminology. However, the study attempts to not only synthesize but also to interpret what is known about the cultural resources of the area. These interpretations draw upon concepts current in anthropological theory, concepts that may not always be familiar to the non-specialist. Where uncertainty arises, land managers should consult their staff archeologists.

As noted, the task of synthesizing the literature of an area can be monumental. For many regions, this could easily produce a volume of unwieldy proportions. What is often not acknowledged by the writers of overviews is that, to avoid such unwieldiness, it is necessary to be selective in the information one presents. Whether consciously or unconsciously, every author of such a study does this. I have endeavored to consistently present information which is useful both to land management and to the interpretations which are developed herein. Although I have tried to briefly describe the salient characteristics of the cultural/temporal subdivisions of the area, my emphasis has been on reporting such things as population trends, subsistence modes, trade, social organization, and patterns of land use, whenever information on these topics was available. The following chapter will make clear the reasons why these were selected.

Background research for this overview began on June 1, 1979, and continued for approximately five months. The writing of this document began about November 1, 1979, with

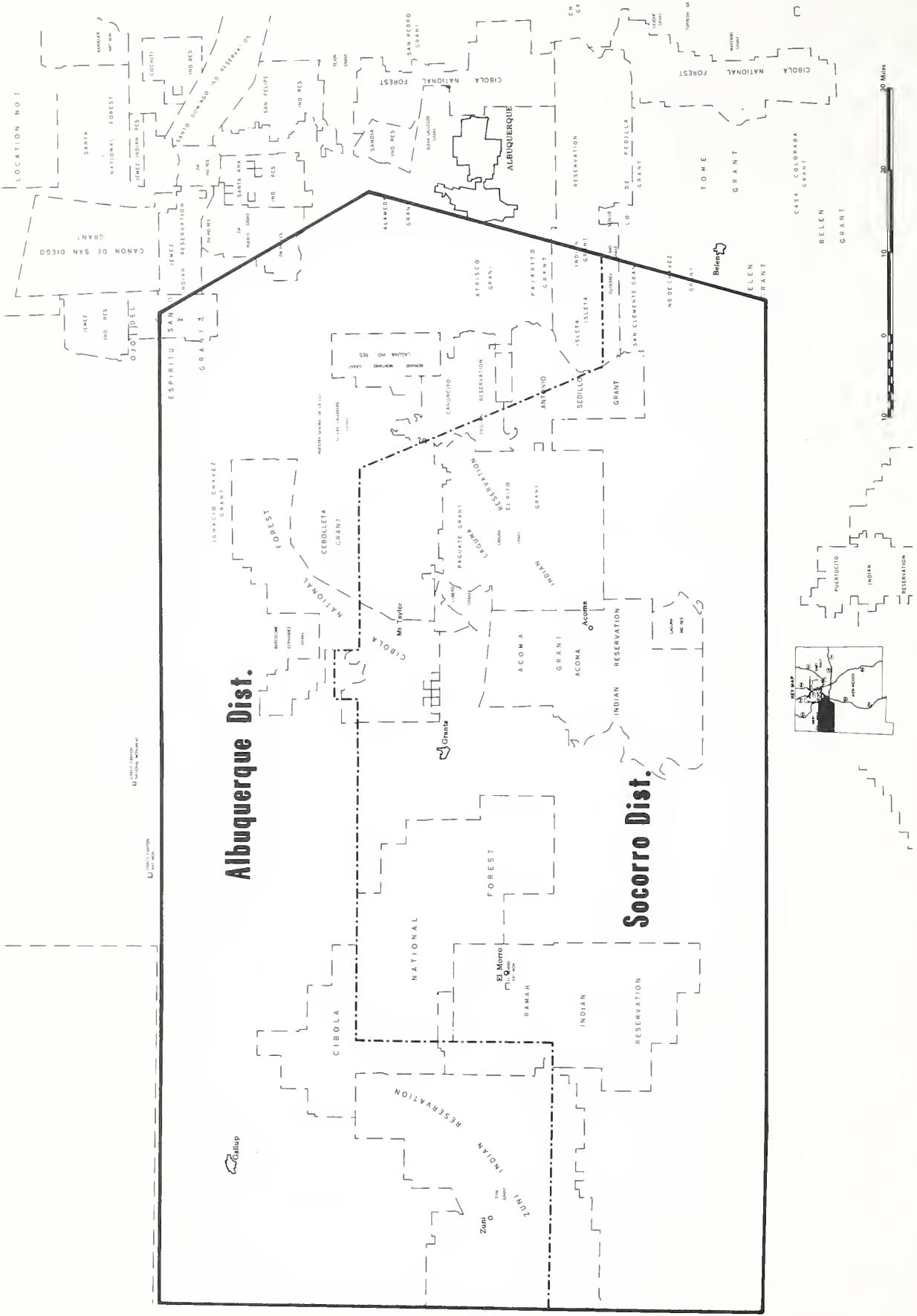


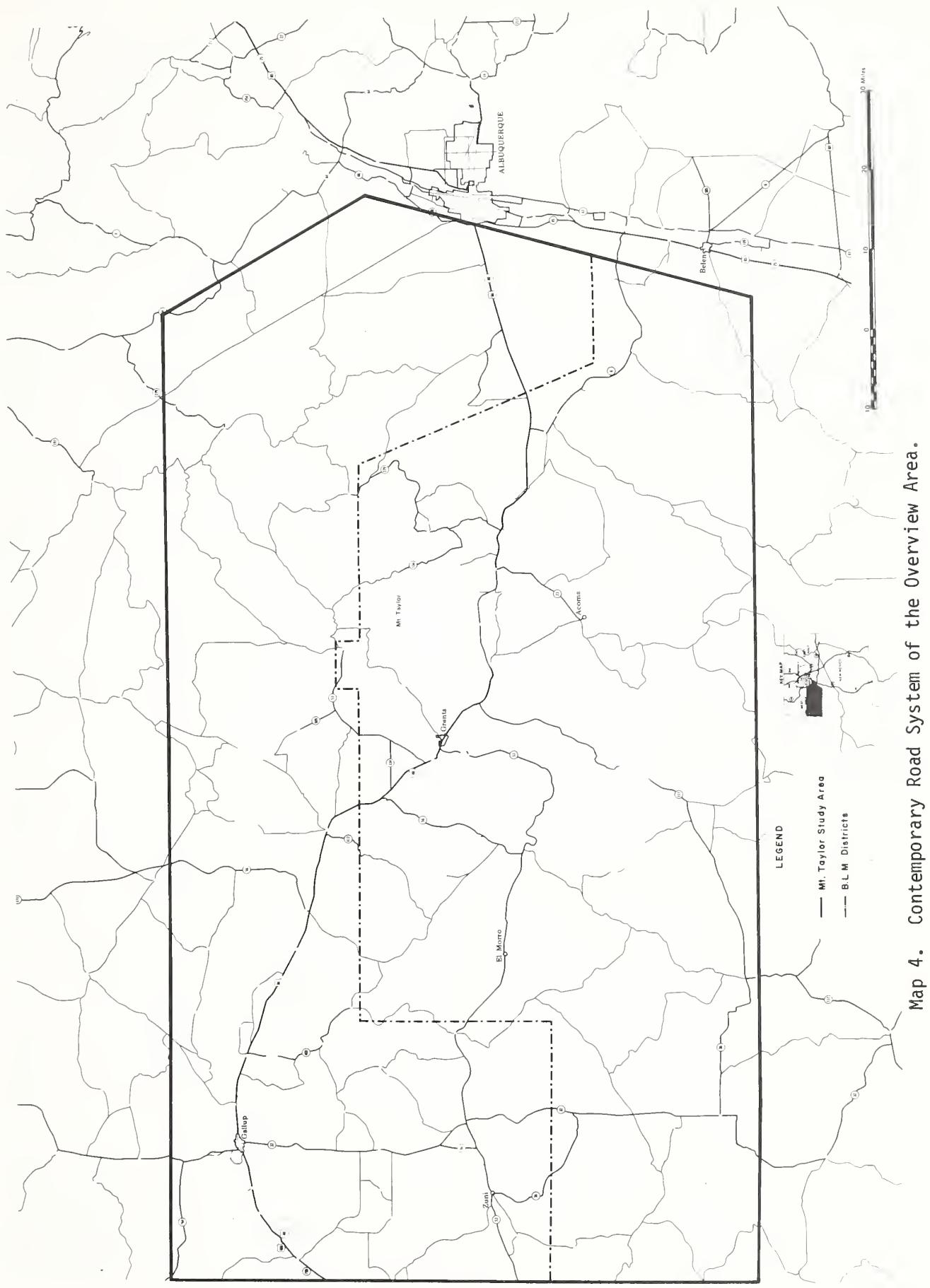
Map 1. Forest Service-Bureau of Land Management Joint Cultural Resource Overview Units.



Map 2. The Mt. Taylor Overview Area, Showing Political Subdivisions.

Map 3. Administrative Subdivisions of the Overview Area.





Map 4. Contemporary Road System of the Overview Area.

a draft essentially completed by mid-February, 1980. Due to my other responsibilities as Cibola National Forest archeologist, the writing of the overview did not occupy my full time, but it did occupy most of it.

I have attempted to include in the bibliography every source I could locate which described cultural resources in or relevant to the overview area. Cultural resources clearance investigations which did not locate sites are not included, nor are all reports produced by the Bureau of Land Management. Beyond these, the bibliography represents a fairly complete listing of the archeological literature of the overview area, current as of mid-1979.

THE OVERVIEW AREA

The Mt. Taylor area of west-central New Mexico is a topographically varied landscape, characterized by a diverse assemblage of plains, canyon, riverine, mesa, and mountain habitats (Maps 5 and 6). Elevation ranges from about 5000 feet in the southeast, to a maximum of 11,389 feet at Mt. Taylor, in the center of the overview area. Major drainages include the Rio Puerco of the west and the Zuni River in the west, and the Rio Puerco of the east and the Rio San Jose in the east. The Jemez River on the northeast, the Rio Grande on the east, and the Rio Salado on the south, lie immediately outside the overview area, but were certainly part of the land use pattern of the prehistoric occupants.

Geological Structure

The Mt. Taylor overview area is classified as part of the Colorado Plateau. The northwestern part of the area, including Dutton Plateau and Manueilito Plateau, is included within the Navajo Section of the Colorado Plateau. The sandstone beds in this area are not quite horizontal and are subject to severe erosion. As a result this area is characterized by a striking, distinctive topography. To the south, the Datil Section of the Colorado Plateau contains diverse features, among which those of volcanic origin are prominent. The most distinctive feature of this section is the Zuni Plateau, an elongated dome (Fenneman 1931:313, 317).

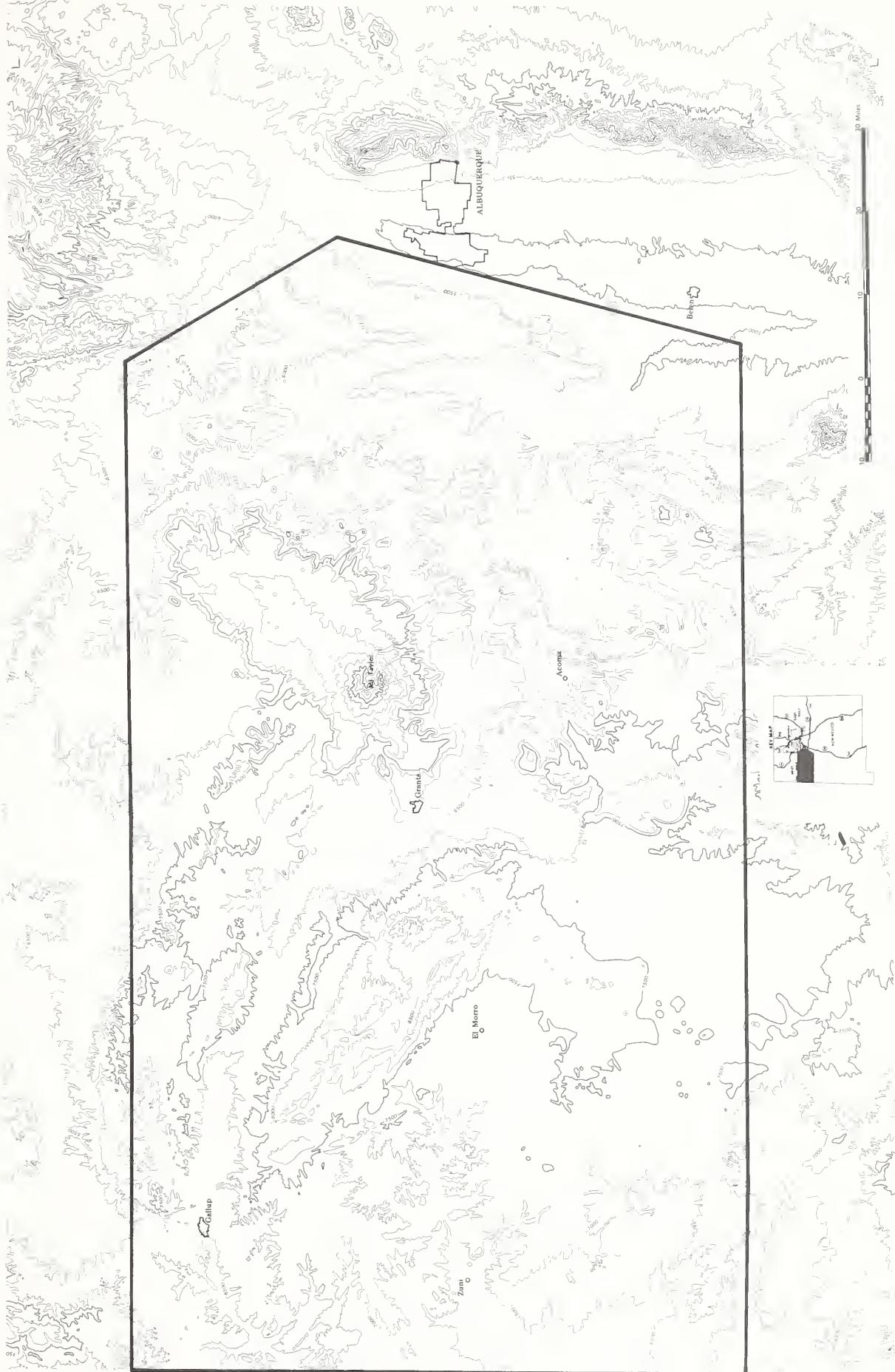
The structure and geomorphology of west-central New Mexico have been described by Fitzsimmons (1959), whose synthesis is shown in Map 7. In the western portion of the area, the Zuni Uplift is an elevated feature 75 to 85 miles long, and half as wide. Along with the Gallup Embayment and the Acoma Embayment, it forms the southern boundary of the San Juan Basin. Elevations reach a maximum of about 9200 feet. The terrain is not rugged, being characterized as rolling upland with locally more severe terrain around the central core of the uplift.

The Gallup Embayment is a structural trough with a relatively flat bottom. The surface of this trough is now incised by streams and slopes with gradients steeper than the Rio Puerco and the Zuni River.

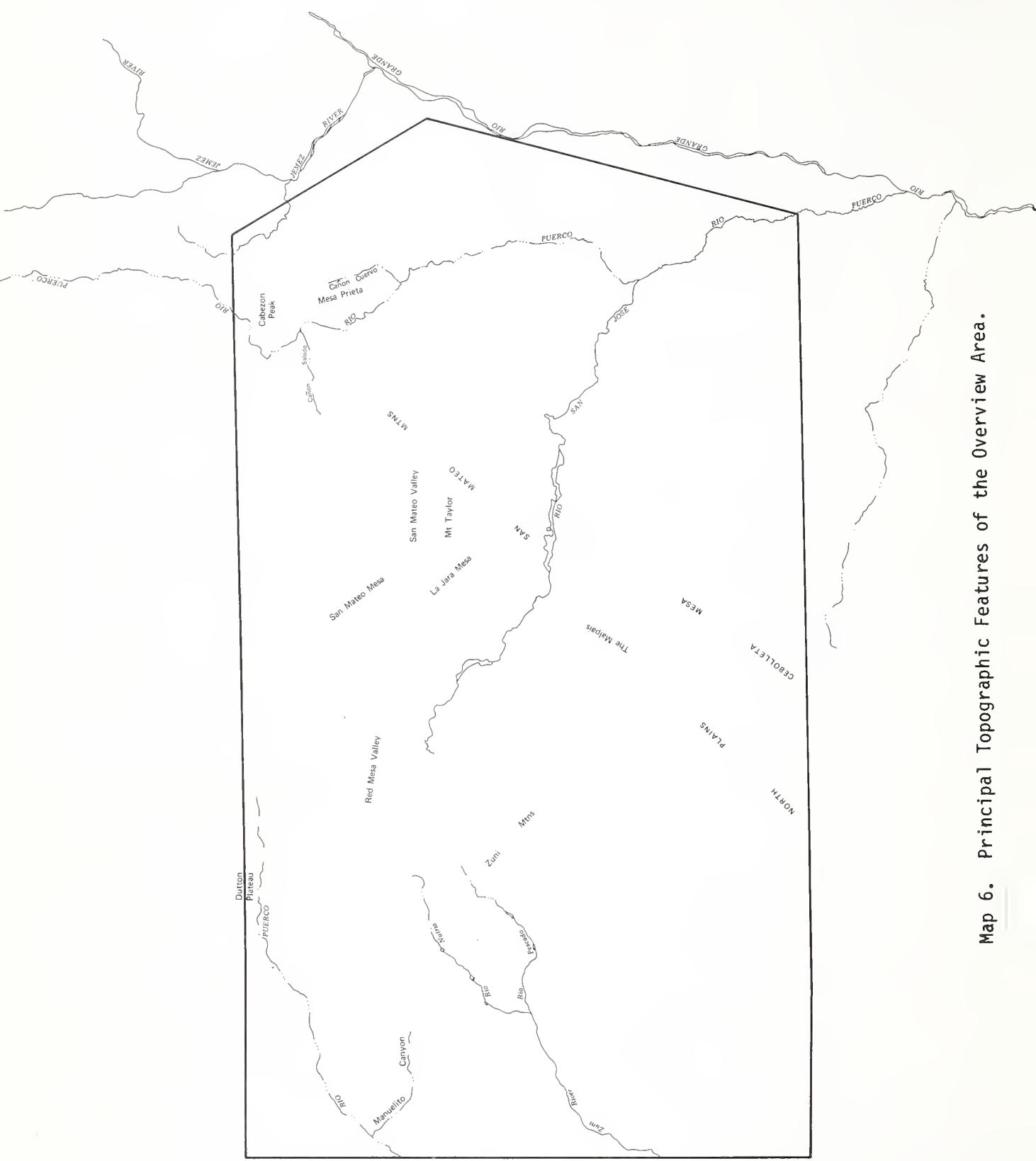
The Acoma Embayment is a feature of folded and faulted Cretaceous and older strata, east of the Zuni Uplift. It has little structural demarcation on the north, where it grades into the San Juan Basin, and on the south, where it grades into the Mogollon Slope. The Acoma Embayment is marked throughout by features of volcanic origin, including Mt. Taylor in its northwest corner, along the Rio Puerco, southeast of the Zuni Mountains, and farther to the south. Old erosion surfaces graded to some stage of the ancestral Rio Grande are preserved throughout this area.

The east side of the Colorado Plateau is marked along much of its length by large structural features. But between the Nacimiento Uplift on the north and the Lucero Uplift on the south, the margin is much less definite. Here the margin forms a transition between the Colorado Plateau and the Rio Grande Trough. This margin is termed the Rio Puerco Fault Zone. The old erosion surface of the Acoma Embayment is represented in this zone, but has been extensively dissected by the Rio Puerco and its tributaries. The West Mesa volcanoes are a principal feature. They form prominent peaks above the softer Cretaceous sediments.

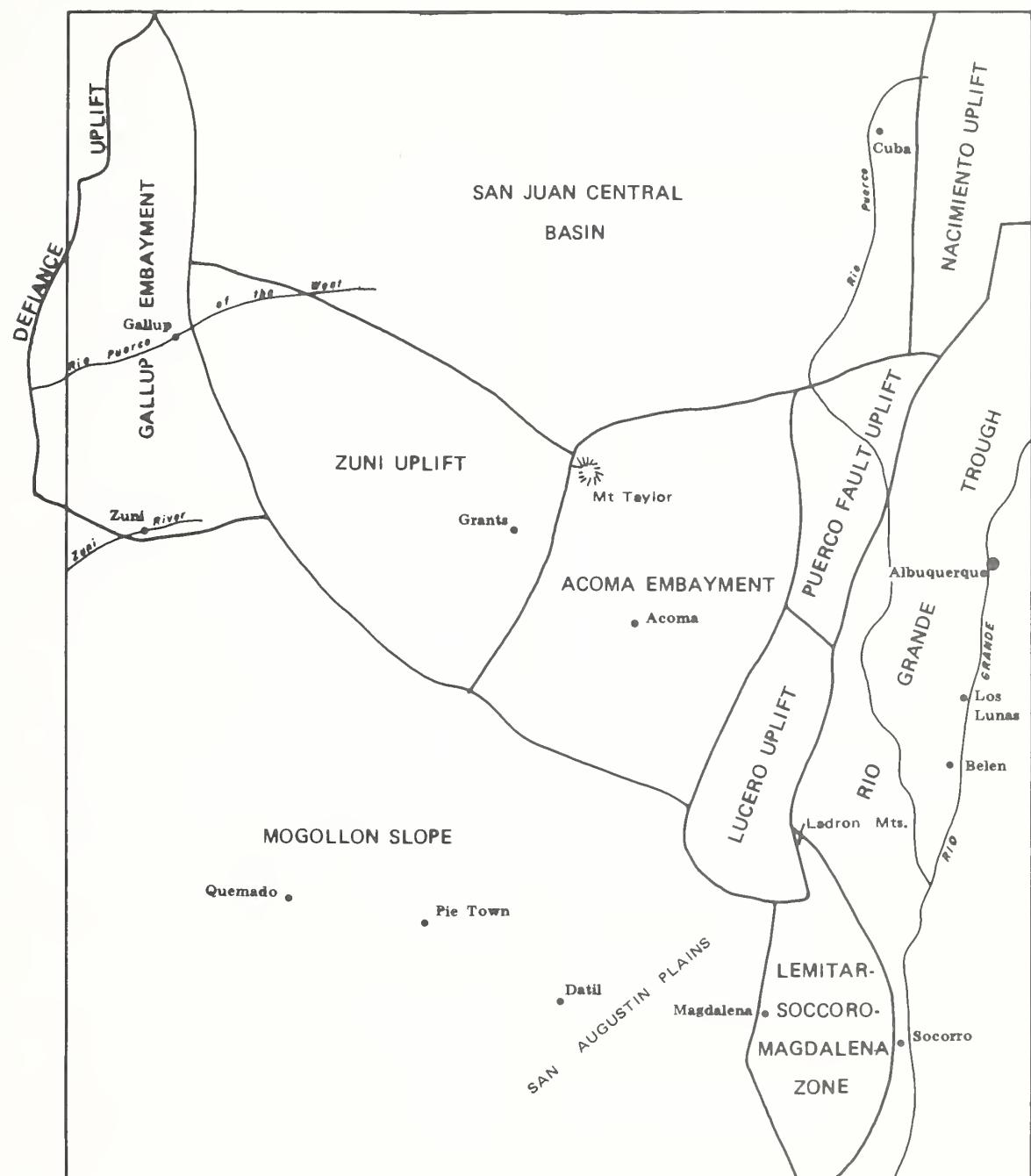
The Lucero Uplift separates the southeastern part of the Acoma Embayment from the Rio Grand Trough. Its northern end is broken by a series of faults which mark the southern end of the Rio Puerco Fault Zone. It has low topographic relief on its east side.



Map 5. Topography of the Overview Area.



Map 6. Principal Topographic Features of the Overview Area.



Map 7. Distribution of Structural Units in West-Central New Mexico (after Fitzsimmons 1959:112).

The Rio Grande Trough does not consist of a single graben or axial depression. The present Rio Grande Valley may be considered as an integrated system of linked basins. The main part of this valley is now lowered below the level of the erosion surface mentioned above. A remnant of this surface is preserved as the West Mesa. The western margin of this trough is formed by faults of the Rio Puerco Fault Zone. The Rio Grande Trough forms a fairly broad floodplain cut below the level of the older erosion surface. Its west margin is marked by the aligned volcanic centers of the West Mesa.

The Mogollon Slope constitutes the southern part of the Colorado Plateau, and is a rather nondescript structural unit. In general, its sedimentary rocks slope gently to the south. The Mogollon Slope is dotted by accumulations of volcanic rocks of many kinds. Its topographic features, due mainly to volcanic accumulations, are principally constructional rather than erosional (Fitzsimmons 1959:112-115).

The geology of the overview area is today exerting a considerable influence on the conservation of cultural resources. Minerals development in the region has proceeded at a rapid rate over the past few years, and will continue to do so. This development has been spread throughout the overview area, but has tended to concentrate on the uranium deposits of what is called the Grants Mineral Belt. This belt is located in an arc from north of Gallup east into the Laguna Reservation. As of March, 1978, approximately 46 percent of the nation's uranium output came from this belt (Jennings 1978:42). According to Jennings (1978:25), mineral commodities in the area include the following:

1. Uranium and accessory elements (vanadium, selenium, molybdenum),
2. Coal,
3. Standard weight aggregates (black-run sand and gravel and crushed rock),
4. Lightweight aggregates (pumice, perlite, scoria),
5. Thorium and rare earths (heavy mineral placer),
6. Carbonaceous shale (humates, humus),

7. Clays (bentonite).

Vegetation Zones

Of the six transcontinental life zones represented in New Mexico, the overview area contains three. The lowest of these is the Upper Sonoran Zone, which in the overview area extends from about 5000 feet to about 7000 feet. It is the major zone of the study area, both in terms of territory and in terms of human occupation. The climate of this zone is mild, without great extremes of cold or heat. The zone is mainly arid, with enough moisture to support grass, but without enough for simple agriculture except in topographic settings which collect runoff. There is a dominant grassland character to this zone. Trees include pinyon and juniper in the upper reaches of the zone, with juniper reaching to lower elevations. Ponderosa pine occasionally edges downward, while along streams, cottonwood is characteristic. Sagebrush is often present throughout the pinyon-juniper belt (Bailey 1913:25, 35; Elmore 1976:13).

The Transition Zone lies between 7000 and 8500 feet on northeast slopes, and between 8000 and 9500 feet on drier southwest slopes. It covers the Zuni and San Mateo Mountains, and parts of the Dutton Plateau. Compared with the zones above and below, it is intermediate in temperature, moisture supply, and soil conditions. The soils are relatively dry and sandy, containing little or no humus. Ponderosa pine and Gambel oak dominate the zone. However, on cool, north slopes, Douglas fir will intermingle, with occasional Aspens. On lower, drier slopes, pinyon will be found. Hence, the term Transition Zone is appropriate (Bailey 1913:42; Elmore 1976:109).

The Canadian Zone is found in the upper portions of the Zuni Mountains, and around Mt. Taylor. On cold slopes it will range between 8500 and 11,000 feet, and on warm slopes, between 9500 and 12,000 feet. It is a densely forested zone, characterized by spruce, fir, and aspen (Bailey 1913:46; Elmore 1976:157, 173).

Fauna

A variety of faunal resources found in the overview area were useful to the aboriginal

occupants. Mule deer tend to concentrate in sagebrush, pinyon-juniper, Ponderosa, and fir vegetation, while elk is most common in the higher elevations. A large variety of rodents are most abundant in the lower elevational ranges, and would have been the major faunal resource in the Upper Sonoran Zone. Birds are particularly diverse, with the greatest variety found in wooded habitats (Whitford 1978).

Climate

Yearly precipitation in the overview area ranges from about 10 inches on the West Mesa, to about 25 inches on top of Mt. Taylor. Albuquerque, just outside the study area to the east, averages 8.4 inches. This low figure is characteristic of the Rio Grande Trough (Tuan, Everard, and Widdison 1969:18). Periods of steady rain for several days are almost unknown. Intense rainfall results mainly from summer thundershowers, and is quite localized. The center of greatest intensity from a storm might be no more than 5 to 10 square miles, although some moisture will often be distributed more widely. The San Juan Basin has the least intensive rainfall in the state (Ferrill 1978:96). Localized rainfall intensity was one variable of particular importance to subsistence farmers.

Of perhaps greater significance than yearly rainfall averages were yearly and seasonal fluctuations in moisture. Rainfall patterns in the temperate zones can be quite variable in the short run, and can also display longer term tendencies toward drought, abundance, or cyclicity (cf. Ebert

1978). In arid zones, these fluctuations can have serious consequences for the very survival of affected human populations. Cultural mechanisms for dealing with resource fluctuations are discussed by Ford (1972), Jorde (1977), Hunter-Anderson (1978), and in this volume. Precipitation in New Mexico tends to be more variable in winter than in summer (Tuan, Everard, and Widdison 1969:54), a point with obvious implications for spring seed germination.

With average vertical temperature drops of 5°F per 1000 feet elevation, the frost-free season in the overview area averages 140-180 days (Tuan, Everard, and Widdison 1969:65, 87). This figure can be misleading, though. Plant growth normally does not occur below 40° to 42°F. The season with temperatures above this level is, of course, shorter than the frost-free season (Ferrill 1978:105). Regarding the occurrence of killing frost, differences in local topography may be more important than absolute altitude. Sheltered valleys will often collect cold, heavy air, leading to frost, while other topographic features remain unaffected (Ferrill 1978:105). Unfortunately for aboriginal agriculture, such low-lying spots, which often collect runoff, are frequently the best locations for agriculture in an arid environment.

It can be seen then that the past occupants of the study area were faced not only with an environment which was arid and relatively unproductive, but also with conditions of perpetual variability and uncertainty in their resource bases. To a large degree, the cultural resources of the overview area reflect strategies for coping with these problems.

CONCEPTUAL FRAMEWORK

The core of a Cultural Resources Overview is built upon the distillation and synthesis of the known cultural history of an area. To the land manager, who is typically a layman in the fields of archeology and history, this may appear to be a straightforward task: one reviews the literature of the area, abstracts and synthesizes relevant information, and proceeds to write one's overview. Yet the reality of the process is far more complex. In the world of science, terms that may appear clear to the layman achieve exceptional ambiguity; conclusions which may seem to carry the force of certainty become reduced to levels of probability or improbability. And most important of all, in the world of science, knowledge may be a transitory acquisition. That which constitutes important "knowledge" at one point in time may, in the later development of a discipline, come to be regarded as inconsequential, misguided, or simply wrong (improbable). The transition from Newtonian to Einsteinian mechanics provides a classic example (Kuhn 1962:98-102).

Scientists who have introspectively examined the nature of scientific reasoning, and the process of knowledge acquisition, use with caution such terms as "right," "wrong," and even "knowledge." Science does not deal with things which are known. Science deals only with ideas in which one can hold varying degrees of confidence. Confidence in turn derives not only from the extent to which ideas are congruent with our perception of the universe, but since one can never examine the universe completely, confidence also derives from the theoretical orientations within which ideas are generated and viewed. As shall be discussed in the following section, such theoretical orientations guide and structure research; inquiry cannot proceed in the absence of such an orientation, however implicit it may be.

So the task of synthesizing "knowledge" about the prehistory of an area is not straightforward. At the minimum, an overview must recognize that archeological inquiry has been conducted in most areas over a rather long period of time. During this interval, the basic orientations and goals of archeological inquiry have changed profoundly. That which constituted meaningful, up-to-date "knowledge" at one stage

in the investigation of an area, may become knowledge in which the archeological profession has changed its level of confidence by the time an overview comes to be written. (Note that this will not necessarily be the case, but that often it is.) And this altered confidence will not be based merely upon the acquisition of more excavated sites or more surveyed land areas, but more basically upon a change in theoretical orientation. It is therefore incumbent upon the writer of an overview to make clear the theoretical orientation under which past and present research has been conducted. It is also necessary to make clear that, since theoretical orientations always change, even an overview is a transitory document. Not only will an increased data base require the eventual updating of an overview, but so also will changes in the guiding intellectual foundations of archeology. Such changes are inevitable.

Before proceeding to the core of the overview three areas must be discussed. These are 1) the nature of conceptual frameworks in science, 2) selected conceptual frameworks in archeology, and 3) the conceptual framework of the present overview.

CONCEPTUAL FRAMEWORKS IN SCIENCE

It is common to think of science as a cumulative, linear process, which continuously builds upon that which has been done before, which replaces uncertainty with certainty, myth and conjecture with knowledge. Science under this view is a process under which knowledge accumulates, so that the day when the universe will be totally understood draws ever closer.

This traditional view of science has been thoroughly disputed by Thomas Kuhn in his classic work The Structure Of Scientific Revolutions (1962). Kuhn attacks the cumulative, linear view of science, noting that the history of science has been more accurately characterized by revolutions in thinking than by accumulation of knowledge. As Kuhn has observed:

The transition from a paradigm in crisis to a new one from which a new tradition of normal science can emerge is far from a cumulative

process Rather it is a reconstruction of the field from new fundamentals, a reconstruction that changes some of the field's most elementary theoretical generalizations as well as many of its paradigm methods and applications (1962:85).

Kuhn goes on to note that, "When the transition is completed, the profession will have changed its view of the field, its methods, and its goals" (1962:85).

It will be necessary at this point to clarify the meanings of some terms. Kuhn suggests that the factor which lends intellectual coherence to a scientific community at any point in time is the existence of a set of shared beliefs which guide research. These beliefs, often implicit, have far-reaching consequences, for they structure the basic assumptions and questions which the members of a scientific discipline recognize. Kuhn terms such a set of shared beliefs a "paradigm." In coming to share a paradigm (whether by academic training or by conversion from a prior paradigm) a group of scientists comes to share a set of tenets which are fundamental in guiding inquiry. Among these are beliefs about the fundamental nature of the subject, the entities which make up the subject, the types of research questions which are important and which legitimately pertain to the subject, techniques for solving these research questions, and acceptable kinds of evidence. Paradigms come to be shared by scientists, not so much because they have solved many research problems, but because they have the promise to. In accepting a paradigm (and for students, the acceptance is rarely conscious) a group of scientists accepts beliefs which guide research along a highly structured path. Deviation from such a path is usually not intellectually acceptable. Most scientific work is done under the guidance of a paradigm, and Kuhn refers to this kind of research as "normal science."

Contrary to popular belief, the majority of scientific inquiry does not aim at making novel discoveries. As Kuhn has noted, "Normal science does not aim at novelties of fact or theory and, when successful, finds none" (1962:52). Normal science instead ". . . seems an attempt to force nature into the preformed and relatively inflexible box that the paradigm supplies"

(Kuhn 1962:24). These statements are not made to downgrade the aims or accomplishments of normal science. Research conducted under a paradigm enables scientists to investigate some phenomenon to a degree which would be unimaginable otherwise (Kuhn 1962:24). Yet inevitably (since no paradigm can account for the universe in its total complexity), observations are inadvertently made which cannot be accommodated under the paradigm. When such observations accumulate to the point that some scientists come to lose confidence in the paradigm, a scientific revolution ensues, and a new paradigm eventually emerges which holds the promise of resolving the observed ambiguities. And although some of the previous paradigm's accomplishments will prove to have lasting value, nevertheless a shift in paradigm brings about a fundamental alteration in world view. At this point, the non-cumulative, non-rational, ideational basis of scientific inquiry emerges. As Kuhn has pointed out:

Like the choice between competing political institutions, that between competing paradigms proves to be a choice between incompatible modes of community life. Because it has that character, the choice is not and cannot be determined merely by the evaluative procedures characteristic of normal science, for these in part depend upon a particular paradigm, and that paradigm is at issue. When paradigms enter, as they must, into a debate about paradigm choice, their role is necessarily circular. Each group uses its own paradigm to argue in that paradigm's defense (1962:94).

Archeology, like other scientific disciplines, has undergone paradigm shifts. These shifts, and their influence upon research, should be made clear in the writing of an overview. In the next section I will discuss the major paradigms which have influenced archeology in the Mt. Taylor area.

CONCEPTUAL FRAMEWORKS IN ARCHEOLOGY

The intellectual development of American archeology has been closely linked with the broader field of anthropology. Most of the archeological research conducted in the Mt. Taylor area (indeed, in the entire

Southwest, in the nation, throughout the world) has been an expression of an anthropological paradigm which Marvin Harris (1968) terms "historical particularism." Dating from the early years of anthropology in this country, and associated with such persons as Franz Boas, Robert Lowie, and Alfred Kroeber, the viewpoint of historical particularism is implied by its name. Historical particularism viewed anthropology as a historical discipline, concerned with studying individual cultures from a developmental perspective. The term particularism refers to the view that the study of human cultures cannot produce generalizations. In this view, the form that any culture takes is the result of innumerable historical influences from neighboring cultures. Since a culture is therefore an amalgamation of elements borrowed at random from neighboring peoples, it follows that no two cultures will ever develop in precisely the same way. Hence, the development of generalizations about human cultures or about cultural change was thought to be impossible. For this reason, it was thought that anthropology should be a particularistic rather than a generalizing discipline, and that the goal of anthropology should be to write descriptive histories of individual cultures.

The influence of historical particularism on archeology has been profound but variable. Many archeologists, for example, seem never to have accepted the notion that it is impossible to generalize about human cultures (as many ethnologists have also not accepted this), and indeed archeologists have repeatedly stressed that ours is a generalizing social science. The most notable influence of historical particularism in archeology has been in the definition of the central concept of culture. Historical particularists subscribe to what is termed the normative view of culture. In normative theory, culture is viewed as a body of shared ideas, beliefs, and values. These are referred to as norms (cf. Flannery 1967). A culture is a group of people who generally share a common set of values and beliefs. In the archeological record, similarities in artifact form (if these occur within a constrained time/space distribution), such as ceramic or architectural attributes, are used to infer the existence of people sharing normative ideas about artifact form, and so to define cultural entities.

To the normative theorist, cultures are thought to be similar to the extent to which human populations share cultural norms. In the archeological record, sites which share a high percentage of similar characteristics, if contiguous in time and space, are interpreted as having cultural relationships. Tracing such relationships is a major goal of normative theorists, and has occupied a good deal of attention on the part of archeologists who have worked in the Mt. Taylor area.

To the normative theorist, cultural change is accounted for by three factors: 1) innovations, 2) diffusion of normative ideas from neighboring peoples, and 3) migration. The last two figure most prominently in the writings of this school.

The persistence of a normative framework in Southwestern archeology has recently been criticized by Linda Cordell and Fred Plog (1979). Interestingly, this critique stems from these authors' experiences in writing overviews. Cordell and Plog raise a number of objections to normative generalizations regarding Southwestern prehistory. Their objections seem to boil down to two main points:

1. Generalizations concerning such variables as village size, architectural types, and subsistence modes ignore an important range of variation. Neither village size nor architectural types can be easily generalized for even small spatial/temporal units, while subsistence modes were subject to yearly variations.
2. Ceramic variability cannot be accounted for simply by reference to space and time. Technology, function, and design may have been independent sources of variation (Cordell and Plog 1979:407-408).

Cordell and Plog make an important point about normative generalizations: they are often inaccurate. And when they are inaccurate, the cultural reconstructions based upon them will be only more so.

Yet, more fundamental questions can be raised about the usefulness of the normative view of culture. To characterize culture as normative ideas is to overlook a wide range of cultural phenomena which cannot be pigeonholed so easily. For example, in our own culture, is the relationship between recession and unemployment

a norm? Is the internal functioning of a nuclear reactor a reflection of cultural norms? Is the pursuit of foreign policy based upon energy supplies derived from normative values? Hardly so! These are all important cultural processes, yet none can be characterized as reflecting shared ideas, values, or beliefs. Simply put, the normative view of culture is not an adequate foundation on which to base anthropological inquiry.

The normative constructs used to explain cultural change--diffusion and migration--must also be questioned. Neither really offers an explanation of why change occurs. In regard to diffusion, the following idea advanced by James G. Miller is relevant:

A system gives priority processing to information which will relieve a strain (i.e., which it "needs"), neglecting neutral information, and positively rejects information which will increase strain (1965:390).

This generalization was advanced as pertaining to living systems of all types; its applicability to the process of diffusion in human cultural systems is obvious. Diffusion, if and when it occurs, is a phenomenon to be explained; it is not by itself an acceptable explanation for cultural change. The tendency to postulate diffusion as a basis for cultural change is one of the most serious weaknesses of normative thinking.

Similar criticisms can be voiced at the use of migration as an explanatory referent. Although substantial movements of population have occurred in the prehistory of the Southwest, this factor has been too often invoked to explain change in the archeological record when the investigator could think of nothing more plausible. Flannery (1967) has properly labeled this tendency the "Old Testament Effect." I have long contended that the only foolproof means of establishing migration in the archeological record is by demonstrating that the recipient and donor populations were biologically the same. This has rarely been attempted in archeology, and is particularly difficult in the Southwest where large skeletal populations are infrequently found.

An alternative to normative thinking has gained prominence in archeology within the last 20 years. Stimulated by the broader anthropological orientation known as "cultural materialism" (Harris 1968), this approach is known by a number of terms: "New Archeology" (an unfortunate label), "Processual Archeology," "the Systems Approach," and the like. The choice of a label is unimportant. Although a diverse assemblage, archeologists who adhere to this still emerging paradigm¹ generally agree on rejection of normative theory as a basis for understanding cultural phenomena. Culture is conceived, not merely as values and beliefs, but as a complex, adaptive system made up of interrelated and interdependent parts. Because a system is made up of strongly interrelated parts, a change in one part necessarily requires accommodating changes in other parts, and in the nature of the system as a whole. Processualists then view cultural change as systemic, involving many linked parts, rather than as mere change in norms. The factors stimulating change are diverse, including both internal characteristics of a cultural system such as population growth or political disequilibrium, as well as external environmental factors. Cultural behavior is viewed not simply as adhering to norms, but as an adaptive response to the conditions in which a group finds itself. The goal of processual archeology is to understand regularities in cultural change and stability, on a world-wide basis, so as to be able to explain cultural phenomena.

In the American Southwest, the approaches taken by normative and processual theorists contrast frequently. Where a normative theorist will wonder how or when maize agriculture diffused from Mesoamerica, a processualist will ask why Southwestern populations accepted an alien subsistence mode. A normativist will ponder whether the cultural phenomena of Chaco Canyon were stimulated or imposed by Mesoamericans, while a processualist will ask how (and why) the political and economic systems of the canyon developed and functioned. And a normativist may conclude that sharing of archeological characteristics indicates contact and diffusion, while a processualist may investigate economic systems that might result in such sharing.

Throughout this overview, the distinctions between normative and processual thinking should be kept in mind.

CONCEPTUAL FRAMEWORK OF THE OVERVIEW

A Cultural Resources Overview offers the opportunity to not only synthesize the known prehistory of an area, but also to cast the synthesis into a new interpretive framework. In the previous section I discussed some of the attributes of the processual approach. The principles of this approach, as presented, are too abstract to guide this synthesis. Accordingly, this section will present more detailed ideas which form an interpretive framework pertinent to the Mt. Taylor area, and also to many other areas. By comparing the information synthesized in the overview against this framework, the present document will be able to contribute more to the purpose of the overview than would be the case if only synthesis was attempted. The following discussion is based upon ideas which have been previously presented (Tainter 1979a).

The framework to be developed suggests that growth of population is a major determinant of cultural change, particularly among societies with a subsistence economy. This framework suggests that the potential for growth is inherent in all human populations, and when growth reaches critical levels, accomodating cultural change must follow. The process by which this happens is, of course, far more complex than is indicated by the facility with which it can be stated.

It can be argued that the capacity for growth of population is a normal characteristic of any successful biological species. All species are subject to demographic fluctuations, at least on a localized basis. When a local breeding population is suddenly reduced in size, the factor which may prevent extinction is capacity for rapid rebound of population. This potential for rapid growth is quite characteristic of human populations. This fact is often overlooked by archeologists who, for example, assume that the human occupation of the New World toward the end of the Pleistocene must have been a gradual process, that vast spans of time were needed from the first crossing of the Bering Land Bridge until population reached

the southern tip of South America. Yet Martin (1973) has pointed out that with annual population growth rates of as little as 1.4 percent, the entire western hemisphere would have been filled within 800 years!

It is of course obvious that the potential for population growth does not by itself account for instances in which growth does occur. Since there are areas of the world where growth of population is not evident we come to the question: what conditions influence human populations to remain static, or grow? There are undoubtedly a variety of answers to this question. For hunting and gathering populations the answer may at least partially lie in the realm of population mobility. In his work among the Kalahari Bushmen, Richard Lee (1972) observed that female members of the population walk about 1500 miles per year in the performance of subsistence tasks, intercamp visits, and residential moves. For at least half of this distance a women will carry substantial burdens of food, water, material goods, and often a child. Most of these burdens must be transported; there can be no means of limiting this work. However, it is possible to exercise some control over this high work load by limiting the number of infants which are carried. To achieve this, Bushman women consciously space births at intervals of three to five years. The explicit purpose of this is to reduce work effort by not having to carry more than one child at a time. Indeed, such birth spacing in response to work involved in carrying infants may have been generally common among mobile hunters and gatherers. It has been observed, for example, in Baja California (Aschmann 1959) and in aboriginal Australia (Birdsell 1968). A consequence of birth spacing is that among mobile hunters and gatherers population growth is constrained below its theoretical maximum, and population may indeed be stable. In contrast, among sedentary populations the work effort of carrying children and baggage is reduced. As a consequence, restrictions on birth spacing are relaxed and birth rates rise. Lee (1972) has observed that among sedentary Bushmen the birth interval dropped from a 48 month average to an average of 33 to 36 months. This decrease of 25 percent or more in the average birth interval has obvious consequences for growth of population. Similarly, Binford and Chasko (1976:70) have observed that

among the Nunamiat Eskimos the transition to sedentism was accompanied by a doubling of the crude birth rate.

In an extended discussion of this subject, Smith (1976) has listed a number of factors which influence population growth among sedentary populations, both hunters and gatherers as well as agriculturalists. These factors include mobility (as discussed) as well as the following:

1. Dietary changes toward increased consumption of animal milk and cereal mush, which are favorable for infant survival.
2. The presence of weaning foods which permit shorter lactation and an earlier return to ovulation.
3. The development of more body fat in sedentary women may hasten the return to ovulation following birth (cf. Kolata 1974:934).
4. Earlier menarche among sedentary groups (cf. Kolata 1974:934).
5. Less frequent absence of males on long-range hunting trips (cf. Binford and Chasko 1976).
6. The perception by agriculturalists that children are economic assets.

Of course, not all of these conditions apply equally to the Southwest.

The question which logically arises next is, under what conditions are hunting and gathering populations sedentary? This question is important for understanding the prehistory of the Mt. Taylor area. The answer is simply that sedentism will occur under conditions where a population's yearly consumption needs can be met from a single location, and where greater work effort in the food quest than under mobile conditions is not required. Where this condition is not met, some degree of mobility is necessary. And of course this attribute is not a simple binary one, since varying degrees of mobility are possible. Among hunters and gatherers lower mobility is expected to generally occur under either of two conditions: first, in environments which are unusually productive, and that produce foods which are storeable, as in portions of the Eastern Woodlands, and second, where topographic diversity is

high, as in the American West. This last factor is crucial to the case at hand. Vegetation zones are restricted in their distribution by, among other things, the occurrence of moisture conditions to which they are adapted. Since precipitation increases with altitude, in topographically diverse regions one will typically find several vegetation zones imposed in close proximity on hill and mountain slopes. This degree of ecological diversity often makes sedentism possible since the different resource zones needed for year-round subsistence are so horizontally compressed that they may often be conveniently exploited from a single location. It is important to point out, though, that topographic diversity is not a sufficient condition to permit sedentism. Where topographic diversity is high but net environmental productivity is low, sedentism will not be possible. Thus in the Great Basin moisture deficiency prevented sedentism, while in the northern Rockies a short growing season achieved the same effect.

The relationships among topographic diversity, sedentism, and population growth are important for understanding the prehistory of the Southwest. Of greater importance, however, is to gain an understanding of the consequences of population growth. Following the work of Ester Boserup (1965) it is possible to generalize concerning the effects of population growth on cultural change. Boserup, in a study of agricultural intensification, suggested that under conditions of population pressure, agriculturalists change their subsistence strategy from extensive systems of cultivation requiring large amounts of land but little labor, to more intensive systems requiring less land per capita but higher labor inputs. Thus, although productivity per unit of land increases, productivity per unit of labor decreases. It is possible to subsume Boserup's argument under the more general Principle of Least Effort (Zipf 1949). This principle suggests that the goal of human endeavor is to maximize return while minimizing cost. Following this principle it can be suggested that a human population living under a subsistence mode will at any point in time follow a subsistence strategy which meets the nutritional needs of the population at the least cost. In other words, the attempt is made to minimize the ratio of effort/return. This being the case, it

follows that any change in subsistence strategy must be in the direction of increasing this ratio, that is, increasing the cost per unit of return. Under the Principle of Least Effort human populations would not be expected to capriciously shift their subsistence strategies to ones requiring greater effort per unit of return. If so, then as Boserup argues, when subsistence strategies are changed in this way, the reason must be that there is some compelling need to do so. That need is population pressure.

Adaptive responses to population pressure can take a variety of forms, each of which may be subsumed under the Principle of Least Effort. Among these are the following.

1. Change in Resources Exploited. For hunters and gatherers, the Principle of Least Effort would suggest that a population will at any time exploit those resources which give the maximum return for the least effort. These are what Asch, Ford, and Asch (1972) have termed "first line foods." When a population expands beyond the level that can be supported by these first line foods subsistence change will have to occur in the direction of exploiting resources which give less return per unit of effort.

Based upon ethnographic studies indicating that hunting and gathering populations generally do not expend large amounts of labor in the food quest, often less than do simple agriculturalists, Cohen (1977) has argued that one of the strategies hunters and gatherers take when faced with population pressure is to shift to agriculture. In a major study, Cohen (1977) has demonstrated that, within the limitations of available evidence, this appears to have been the case repeatedly around the world.

Yet a change to exploitation of less productive foods is not the only means by which a group may adapt to population pressure. A number of other responses are possible.

2. Change in Settlement Strategy. Zubrow (1971) has shown that the use of marginal and/or more distant resource zones can be a response to population pressure. If exploited from a base settlement, the added travel and transport costs of using more distant zones results in an increase in the effort/return ratio.

3. Technological Change. Glassow (1972b) has argued that population pressure will often lead to the development of a complex and costly subsistence technology (such as irrigation). The costs of developing, utilizing, and maintaining such a technology will lead to a deterioration in the effort/return ratio.

4. Social Change. Another method by which a group may adapt to population stress is through the development of complex social arrangements for more efficient organization of population and distribution of resources. Such stimuli for increased social complexity are a topic of perennial concern in anthropology, yet have not been linked to the Principle of Least Effort. This connection is important. Social and ritual systems, like all living systems, require energy for their maintenance. More complex social systems require greater energy per capita than do less complex ones. Following the Principle of Least Effort, it is expected that the earliest human social systems will be of a type requiring the least energy cost per capita. More complex societies, which are more costly, are expected to develop only when a simpler form of organization is no longer suitable. To the extent that social and ritual factors can be considered as adaptive characteristics, elaboration of social complexity can be expected to occur under conditions of population pressure or some other form of stress.

Each of the types of adaptation detailed above has been resorted to frequently throughout world prehistory. Surprisingly, the seemingly obvious solution of population control appears rarely to have been exercised, at least voluntarily. The most noticeable instances occur among mobile hunters and gatherers, in territorially constrained areas such as islands, and in some colonial situations where the dominated population chooses voluntarily not to reproduce (e.g., the California Missions). The most likely reason for this is that human populations seem to find it difficult if not impossible to adapt to anything other than short-term conditions.

The population growth perspective is not without its detractors. Cowgill (1975), for example, suggests the role of political and ideational factors in determining family size. The perspective offered here is that political and ideational factors may not be considered as independent

variables, but may in fact vary in response to population levels. Hassan (1978:81-82) has suggested that the sedentism/population growth argument does not account for variations in the adoption of agriculture in Europe and the Levant, but his arguments ignore the role of topographic diversity.

The measurement of population in Southwestern archeology has always been somewhat easier than in other areas because of the availability of domiciliary remains. (This is not to suggest that it is a simple process, only that it is more straightforward than in other areas.) More crucial is the measurement of population pressure. Cohen (1977:78-82) has suggested a number of archeological criteria which may indicate population pressure, based upon the assumed validity of the Principle of Least Effort. These are: 1) increasing exploit-

ative range, 2) exploitation of new resource zones, 3) exploitation of previously ignored portions of the environment, 4) exploitation of previously ignored foods, 5) increasing concentration on water-based resources, 6) shift to smaller size animals, 7) shift to consumption of lower trophic level organisms, 8) shift to use of foods requiring increased preparation effort, 9) environmental manipulation and degradation, 10) increasing biological evidence of malnutrition, 11) decrease through time in the size or quality of exploited species, 12) disappearance of an exploited species, 13) increasing territoriality, and 14) sedentism and food storage.

With this framework as background, the archeological overview of the Mt. Taylor area may now be presented.

1/ David Meltzer (1979) has recently questioned whether archeology has really undergone a paradigm shift, or, as he believes, merely a methodological change. Meltzer (1979:651) suggests that the rejection of the normative view is only a methodological change. This is a point with which I would strenuously disagree, for rejection of the normative view entails a profound shift in how we view and interpret the phenomena we deal with, and allows us to see processes that were not observed before. In general, Meltzer bases his arguments on selected quotations from sources which may be neither representative nor influential in archeology today. A more extensive review of how archeology is actually being practiced would not support his conclusions.

HISTORY OF ARCHEOLOGICAL RESEARCH

In their synthesis of the history of American archeology, Willey and Sabloff (1974) suggested that archeological research in this hemisphere could be classified into five historical periods: 1) the Speculative Period (1492-1840), 2) the Classificatory-Descriptive Period (1840-1914), 3) the Classificatory-Historical Period: the Concern with Chronology (1914-1940), 4) the Classificatory-Historical Period: the Concern with Context and Function (1940-1960), and 5) the Explanatory Period (1960-__). It will be useful to organize a history of archeological work in the Mt. Taylor overview area in this framework.

The first period in the Willey and Sabloff framework is not of relevance to the overview area, for by and large the Speculative Period did not involve what we would recognize today as field archeology. However, by the beginning of the Classificatory-Descriptive Period (1840-1914) the overview area had become a possession of the United States, and early military expeditions and railroad surveys were made through the region. Some of these described archeological remains.

The Classificatory-Descriptive Period laid the framework for field archeology as practiced today. The period did not see an end to the armchair speculations of the previous era, but it did produce descriptions and rudimentary classifications of at least the more noticeable kinds of archeological remains, such as mounds and pueblo ruins.

In the overview area, this period began with the military reconnaissance of J. H. Simpson in 1849 (Simpson 1852). Simpson sketched and described several of the ruins in Chaco Canyon. In the overview area, he noted scatters of ceramics along the Rio Puerco of the west, described the site now called Atsinna atop Inscription Rock (El Morro), and recorded some of the sites in the Pescado Valley. Simpson was followed by Lorenzo Sitgreaves in 1851, who reported ruins west of Zuni (Sitgreaves 1853), and by A. M. Whipple (1855), who mentioned ruins while surveying a railroad route through the same territory.

Yet it was not until the last two decades of the 19th century that archeological

research in the area really became established. McGregor (1941:35) believes that the period from 1880 to 1910 was the most important in the development of Southwestern archeology, for during these active years the beginning of a science of archeology in this area was established. The overview area figured prominently in this development.

Archeology during this time was more closely allied with the broader field of anthropology than at perhaps any other time. Willey and Sabloff (1974:86) trace this linkage to the early focus of the Bureau of Ethnology, which combined archeological and ethnological work in studying the origins and history of the American Indians. Yet it is doubtful if any single institution was so responsible for this linkage. It was characteristic of anthropology in this day to see both archeology and ethnology as closely linked, even unified pursuits, and individual scholars often shifted between archeological and ethnological work. The Bureau of Ethnology reflected this intellectual climate; it did not create it.

This linkage between archeology and ethnology was undoubtedly the reason why the Zuni area was the major focus of archeological research in the overview area during the last years of the 19th century and the first years of the 20th. The exceptions to this concentration at Zuni were a survey of ruins, reported by Bandelier (1892b), which covered the totality of the overview area, and a reconnaissance made by Hodge (1914) of sites in the Cebollita Valley south of Grants.

Clearly illustrating the lack of an intellectual distinction between archeology and ethnology was the Hemenway Expedition, in which Cushing (1886, 1890) used both archeological and ethnological data to test anthropological ideas. Cushing (1886: 475-476) made an attempt to derive some chronological control over the ruins he dealt with by arguing, following Mindeleff, that rectangular pueblos developed from circular ones. Coincident with this anthropological work, Bandelier conducted archival research concerning Zuni (1892a). In 1895 the Hemenway Expedition excavated part of the prehistoric Zuni town of Heshotauthla. Data from this site were

used by Fewkes (1891) in his descriptive survey of ruins in and near the Zuni Reservation. In one of the major archeological/ethnological studies in the area at this time, Mindeleff (1891) compared the prehistoric and contemporary architecture of the Zuni and Hopi areas.

The subsequent Classificatory-Historical Period, between around 1914 and 1940, had as its main focus a concern for chronology (Willey and Sabloff 1974:88-89). Two techniques developed in this regard were stratigraphic excavation and seriation. Work in the overview area figured prominently in the development of the latter. Classification of archeological remains, for the purpose of elucidating space-time systematics, became prominent later in the period. The ultimate aims of the period were to develop cultural/historical syntheses of various regions.

In the early part of this period, the majority of archeological research continued to concentrate at Zuni. Probably the largest excavation undertaken in the overview area at this time was Hodge's work at the historic Zuni town of Hawikuh (Hodge 1918a, 1918b, 1920b, 1922, 1923, 1924a, 1924b, 1939; Smith, Woodbury, and Woodbury 1966), sponsored by the Museum of the American Indian, Heye Foundation. The Heye Foundation excavated at the same time in the nearby Zuni site of Kechipauan (Hodge 1920a; Bushnell 1955).

But the work with by far the greater significance was the seriation studies by Kroeber (1916b) and Spier (1917) of archeological sites in the Zuni area. Kroeber and Spier were not the first to order prehistoric remains on the basis of similarity, but they were the first to demonstrate the technique in the Southwest.

The important work of Frank Roberts in the Zuni area followed some years later. Roberts excavated at Kiatuthlanna and in the Whitewater District in eastern Arizona (1931, 1939, 1940), and at Village of the Great Kivas on the Zuni Reservation (1932). Robert's descriptions largely remain as the basic comparative material for this area, and the cultural/temporal sequence he developed is still frequently used.

With the accumulation of ever more excavated sites, and with the growing concern

for chronology and classification, Southwestern archeologists met at Pecos in 1927 to develop a general classificatory scheme. The result was the adoption of Kidder's Pecos Classification, the familiar Basketmaker-Pueblo sequence. It was largely but not universally accepted, and problems in its implementation led the Gladwins to publish their own approach to cultural classification (Gladwin and Gladwin 1934). Gladwin (1945) in turn applied this scheme (which is described later in the overview) in his excavations in the Red Mesa Valley, and the resulting classification continues to influence archeological research in that area.

The Pecos and Gladwin classifications represent major accomplishments within the normative framework. The assumptions of these frameworks, including the notion that cultural changes were uniform over broad areas of the Southwest, remain implicit in much archeological research conducted to this day (cf. Cordell and Plog 1979).

A major development of this period was the initiation of large, regional surveys and syntheses, designed both to document the distribution of known sites (Fischer 1931), as well as to provide assessment and interpretation of material remains (Mera 1935, 1939; Luhrs 1937a, 1937b).

The later phase of the Classificatory-Historical Period (1940-1960) continued to be dominated by concern with temporal placement and classification of archeological complexes, but in at least some parts of this hemisphere broader topics came to be addressed. These new topics included the behavioral significance of artifacts, patterns of settlement and community organization, and initial attempts at the study of cultural ecology (Willey and Sabloff 1974:131-132). The new concerns exerted little influence, however, in the overview area.

The volume of archeological research in west-central New Mexico expanded considerably during this period. This was spurred in large part by pipeline and highway constructions through the region (e.g., Wendorf 1954a, 1954b, 1956; Peckham 1954, 1957). These projects attracted national attention, due to the increasing concern archeologists felt about the unmitigated destruction of sites, and stand as

landmarks in the development of cultural resources management in this state.

Research projects, conducted independently of development considerations, enjoyed something of a florescence in this era. Bryan and Toulouse (1943), and Campbell and Ellis (1952), reported on preceramic manifestations in the overview area, while Hibben (1951a, 1951b) surveyed the central Rio Grande Valley for PaleoIndian remains. Herbert Dick (1943) conducted a survey in the eastern part of the overview area, while Correll (1950) reported on excavations in the area which had been conducted by mid-century. Dorothy Keur (1941) excavated the Navajo remains at Big Bead Mesa.

A long-term archeological project was undertaken by Dittert and Ruppé around Cebolleta Mesa, and remains the only major research conducted in this important locale (Dittert 1949, 1959; Ruppé 1953, 1966). In the El Morro Valley, the Woodburys excavated at the prehistoric Zuni site of Atsinna (e.g., Woodbury and Woodbury 1956). Ellis conducted combined archeological and ethnological investigations in the Acoma-Laguna area, preparing statements based upon this research for the Indian Land Claims Commission (1959, 1974a, 1974b). Drawing upon the increasing data base for western New Mexico and eastern Arizona, Reed (1946, 1948) developed syntheses of regional prehistory and addressed the Anasazi/Mogollon boundary problem.

Willey and Sabloff (1974:178) characterize the succeeding phase as the Explanatory Period (1960-__). This term is probably no worse than some of the others used to describe it, although one cannot conclude that the problem of explaining cultural behavior occupies the majority of archeologists' time. It has become, however, a never-forgotten goal. The major characteristics of this approach were described in the previous chapter.

It cannot be said that archeologists in west-central New Mexico, more so than in any other region, were quick to grapple with the research problems posed by the processual approach. To the contrary, the first decade of the Explanatory Period saw archeological research in this area continue to be addressed to problems of chronology and classification. The numerous archeological excavations conducted as part

of the highway salvage program produced data which led several investigators to question both the Gladwin framework and the Pecos Classification (e.g., Wilson 1962a; Wendorf 1954a; Olson and Wasley 1956). The task of analyzing and reporting this large body of data continued into the early 1960s (e.g., Smith 1962a, Wilson 1962a, Bussey 1964). This concern with classification and chronology has been evident in very recent work in the area (Harrison 1976; Bussey n.d.). The dispersal of San Juan Basin populations occupied the attention of Emma Lou Davis (1964). In the eastern subarea, Hibben has spent several years excavating the large, aggregated settlement of Pottery Mound (1955, 1967, 1973). Schoenwetter and Dittert's (1968) climatic analysis of Anasazi settlement patterns was in a more processual vein than most of the studies which dealt with the overview area in the 1960s. The recent paper by Euler and others (1979) continues this climatic research.

By the late 1960s and early 1970s, the effects of the intellectual changes overtaking American archeology began to appear in the overview area. Among the first processual studies were Irwin-Williams' (1973) analysis of the Oshara Tradition, and Judge's (1973) study of PaleoIndian settlements in the central Rio Grande valley. Dorothy Washburn (1974) has subsequently analyzed Pueblo settlement patterns in the upper Rio Puerco drainage. A major research project was conducted in the early 1970's in the Ramah-El Morro area by Watson, LeBlanc, and Redman (n.d.). Studies of the Chacoan outlier phenomenon have been sponsored by the Chaco Center (Powers n.d.), and by Public Service Company of New Mexico (Marshall and others 1979). Interpretive syntheses of the regional Chacoan phenomenon have been developed by Grebinger (1973), Altschul (1978), and Judge (1979). Weaver's (1978) work in Manuequito Canyon focused on explaining the abandonment of that area.

With the expansion of federal protection for archeological and historical resources, the 1970s have witnessed unprecedented expansion in contracted archeological research. With the mineral resources of the overview area, this kind of work will without doubt become even more intense. The volume of this work is too great to even begin to review individual studies. A

fairly complete bibliography is included in this document. Among what I consider to be the more significant studies are Allan's survey in the San Mateo Valley (Allan and others 1976), Gauthier and Stein's (1977)

GASCO pipeline survey in and adjacent to the Red Mesa Valley, and Hunter-Anderson's (1978) survey of the Yellowhouse Dam project on the Zuni Reservation.

PREHISTORY: OVERVIEW

ORGANIZATION OF THE DATA

The overview area contains an abundance of archeological remains, and these display some diversity in the sociocultural behavior that they reflect. In addition, the area has experienced a substantial number of archeological projects. To gain some control over this diversity the overview area has been subdivided into five subareas: Eastern, South-Central, North-Central, Northwestern, and Southwestern. Approximate boundaries for these are shown in Map 8. The prehistory of each subarea, from the Archaic Period onward, is discussed separately, with a synthesis in the following chapter. The PaleoIndian Period is discussed for the entire overview area.

In constructing these subareas, I do not wish to imply that they possessed any kind of sociocultural unity, or that the boundaries reflect prehistoric entities. These subareas have been drawn so as not to violate any known sociocultural entities. Thus, the Acoma Culture Province is included in the South-Central Subarea; the Zuni region in the Southwestern Subarea. But other than this elementary precaution the subareas should not be interpreted as reflecting past sociocultural distinctions. They more closely reflect areas where research has concentrated.

THE PALEOINDIAN PERIOD

The PaleoIndian phenomenon in this hemisphere is an ambiguous one. In large part this is due to the low number of known PaleoIndian sites. Judge's (n.d.) recent review of the subject dealt with only 101 excavated sites from the Plains and the Southwest. When a discussion of Paleo-Indian is restricted to a small geographical area the problem of low sample size is compounded. The situation is analogous to probability sampling. When a large sample is drawn from a sizeable geographical area the probability of acquiring the data needed to answer research questions is correspondingly high. But when a low sample is drawn from a small geographical area, gaps in knowledge will inevitably result. To a degree, then, this overview must be concerned with the broader Paleo-Indian phenomenon as a whole. However, this document does not attempt a synthesis

of the PaleoIndian period in the Southwest, since two excellent reviews of this topic (Irwin-Williams n.d.a; Judge n.d.) have recently been written.

PaleoIndian research has characteristically subdivided the long temporal span of this period on the basis of lithic technology, most particularly gross projectile point morphology (see Fig. 1). (For an exception to this pattern, see Judge n.d.) The resulting classification recognizes (or assumes) variations in cultural behavior and adaptation regularly co-occurring with changes in point morphology. While it is disconcerting to encounter normative references to such things as "the Clovis culture" in the literature of this period, nevertheless, behavioral distinctions are evident between many of the typological subdivisions utilized. With the accumulation of a larger data base, and the search for behavioral variations within Paleo-Indian typological units, the profession will undoubtedly come to recognize that terms such as "the Clovis culture" are far too generalized to reflect the reality of socio-ethnic differentiation in hunting and gathering societies.

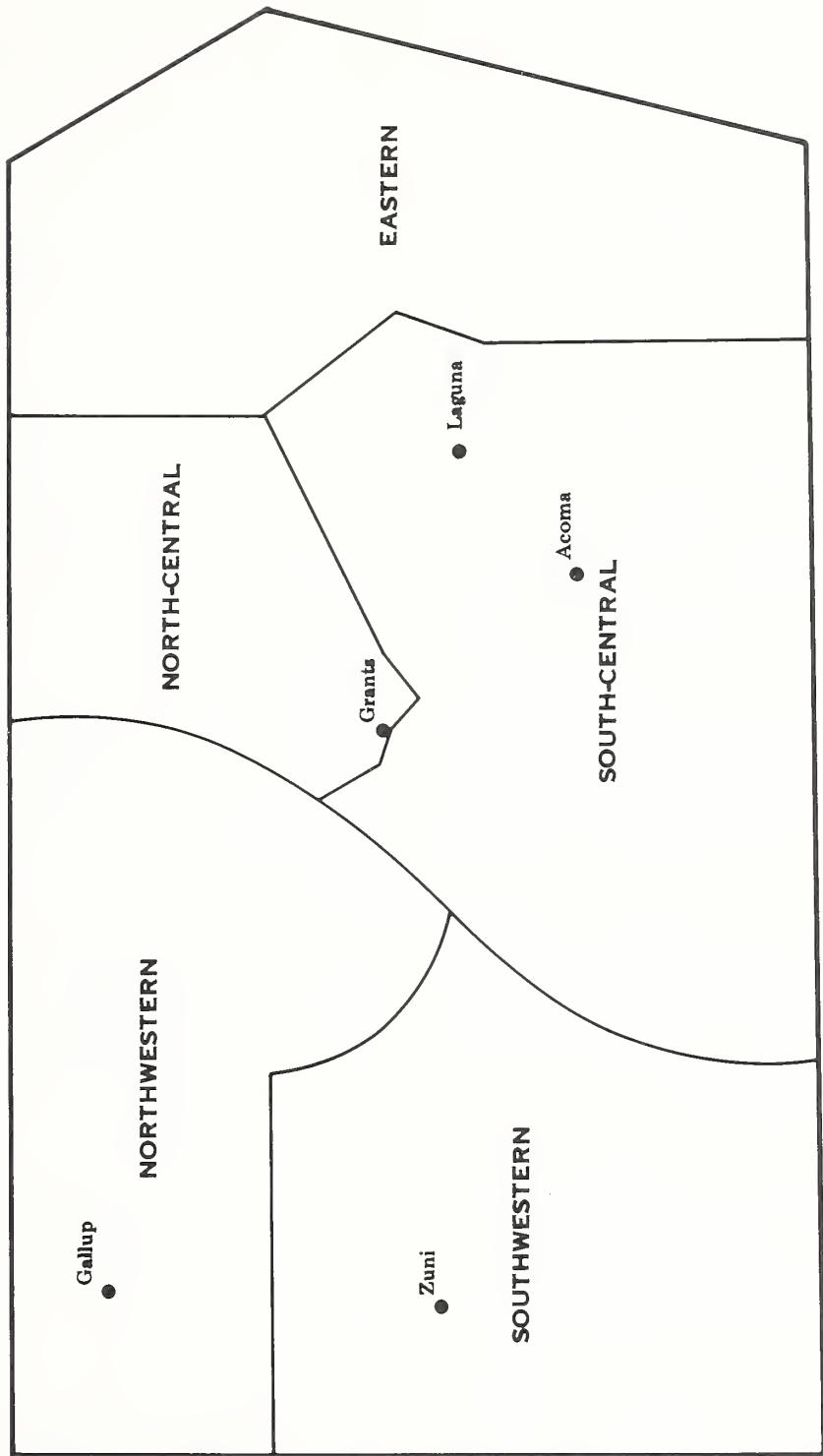
In recent syntheses of the PaleoIndian period, Cynthia Irwin-Williams (1977b, n.d.a; Irwin-Williams and Haynes 1970) has suggested close linkages between climatic fluctuations and PaleoIndian occupation in New Mexico. In brief, the following patterns of moisture fluctuation have been discerned in paleoecological research (Irwin-Williams 1977b, n.d.a; Irwin-Williams and Haynes 1970):

Pre-10,000 B.C.: greater effective moisture than at present in the southwest;

10,000 - 9500 B.C.: a period of decreased effective moisture;

9500 - 9000 B.C.: return to increased moisture;

8600 - 5000 B.C.: a period of generally decreased moisture, with a minor reversion to increased moisture between 6700 and 6000 B.C., followed by a decrease to conditions similar to the present;



Map 8. Subareas of the Overview Area.

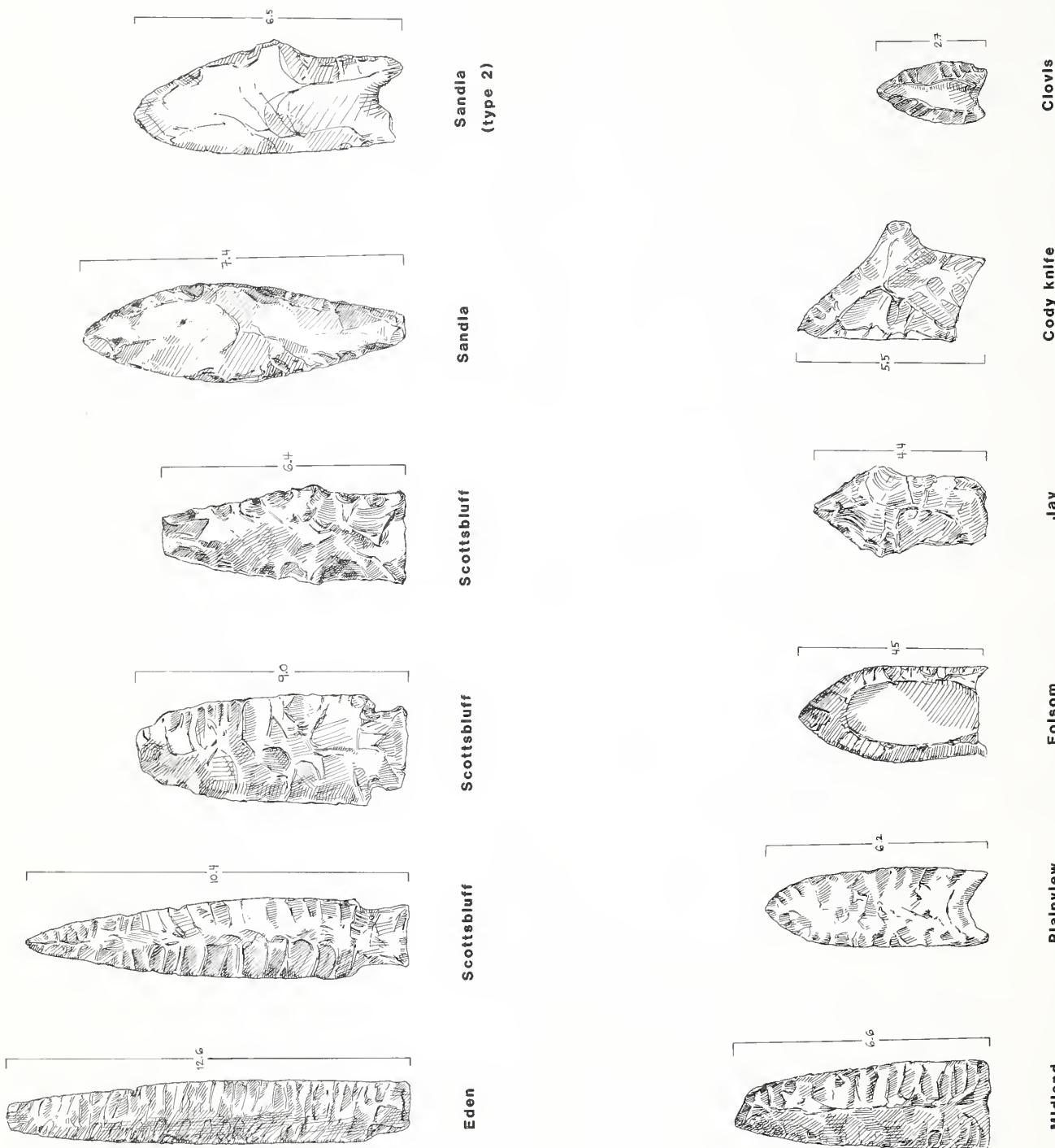


Figure 1. Early Projectile Points. All measurements are given in cm.

5000 - 3000 B.C.: The Altithermal period, a time of noticeably decreased moisture;

3000-2500 B.C.: the Medithermal, a period of greater moisture than present.

Pre-Clovis

Pre-Clovis (that is, pre-9500 B.C.) occupation of this hemisphere is a controversial subject. Most of the sites which have been claimed to date prior to Clovis have been the subject of academic disputes. Sandia Cave (Hibben 1937, 1941), located on the Cibola National Forest east of the study area, has been the subject of particularly virulent controversy. Judge (n.d.) has recently reviewed the evidence for pre-Clovis sites in the New World and has concluded that the sites which might be academically acceptable tend to be concentrated (but not exclusively) in the western, high altitude areas of both North and South America. This pattern suggests an adaptation which excluded grassland areas of low ecological diversity from intensive exploitation. In contrast, subsequent populations concentrated noticeably on low diversity habitats, practicing a focal economy which many scholars feel was concentrated on big game (Judge n.d.:57).

In the study area, Sandia-like points were reported by Agogino (1957b) from the San Jose Valley, fifteen miles southwest of Correo. Recent research (Judge n.d.:13) has suggested that the Sandia "points" may have actually been knives, and hence not a temporally diagnostic point.

Clovis

The Clovis occupation of the Southwest corresponds with a period of increased effective moisture between 9500 and 9000 B.C. Irwin-Williams and Haynes (1970:61) suggest that during this period of increased moisture the western United States witnessed a dramatic increase in population, with concomitant expansion into new regions. In the Southwest during this time, the faunal assemblage was basically an extension of that of the Plains. Clovis exploitation of fauna was concentrated on the extinct mammoth, although Judge's (n.d.:27-29) recent re-evaluation of Clovis

artifact complexes indicates that Clovis populations were probably scavenging mammoths, rather than systematically hunting them. In addition to mammoth, bison, horse and smaller fauna have been recovered at Clovis sites. Irwin-Williams (n.d.a:10) believes that these were not of economic importance. Judge, however, suggests that the Clovis adaptation was in fact eclectic, being transitional between earlier, diffuse economies, and later, focal strategies (n.d.a).

Clovis sites are more widely dispersed than those of subsequent time periods, and are less restricted in their distribution to specific microenvironmental situations. In general, though, sites are found near sources of water and/or in areas where game animals could be trapped or driven.

The Clovis technology is distinctive and well-controlled. In addition to the diagnostic fluted points, common artifacts include side scrapers, raclettes, bifacial knives, perforators, utilized flakes, and hammerstones. The raw material for the implements came from as much as 100 to 200 miles from the place of final tool disposition, suggesting either extensive trade networks, or an economic cycle with a broad territorial base (Irwin-Williams n.d.a).

Clovis sites are not intensively distributed in the study area. In his survey of the Middle Rio Grande Valley, Judge (1973: 74-75) found only two sites and a number of isolated points.

Folsom

The succeeding Folsom occupation is dated to between 8800 and 8300 B.C., during a period of decreased moisture relative to Clovis (Irwin-Williams n.d.a). Perhaps as a consequence, Folsom settlements are more concentrated on major water sources. Mammoth and other elements of the Clovis faunal assemblage had declined or become extinct; Folsom hunters concentrated instead on Bison antiquus, an extinct form. Indeed, Irwin-Williams and Haynes (1970:63) have suggested that from Folsom times onward, PaleoIndian adaptive strategies centered on bison ecology. This extinct variety of bison was rare or absent west of central Arizona, and correspondingly no Folsom remains have been found beyond this boundary. Overall, the Folsom occupation

represents a shrinkage in the area of PaleoIndian occupation.

The vegetational pattern in the Southwest during Folsom times was a mosaic of interspersed grasslands and woodlands. Judge (n.d.:61) suggests that this vegetational pattern would have prevented formation of large bison herds. It is significant that Folsom kill sites display an average of only 15.25 bison, compared with 98.25 in later Plano sites (Judge n.d.:61). Apparently, more pronounced seasonality following Folsom led to replacement of the pine-parkland mosaic by open, grassy plains, leading to aggregation of bison herds.

Distinctive indicators of the Folsom period are, of course, the Folsom points. In an analysis of several metric attributes on Folsom points from the Middle Rio Grande Valley, Judge (1973:165, 171) found that basal point width exhibited the minimal range of variation and so may have been the most critical variable in point production. Judge (1973:175-176) interprets this to indicate that points were being produced to fit a previously made foreshaft, possibly fashioned from bison rib. Other characteristics of the Folsom lithic assemblage, listed by Irwin-Williams (n.d.a), include well made end scrapers, side scrapers (in reduced frequency from previous time periods), perforators, spurs, knives, denticulates, and raclettes.

Folsom sites are better documented in the study area than those of any other Paleo-Indian complex. Judge (1973) found 29 (including Judge's sites and localities) in his survey of the Central Rio Grande Valley. There is a Folsom (and later PaleoIndian) site recently found on the Acoma Reservation (B. Harrill, personal communication). Its setting suggests a game trap. Another is located about thirteen miles south of Grants on a ridge which would have provided an excellent overview of the surrounding valley. This site has recently been test excavated by John Speth of the University of Michigan (S. Peckham, personal communication). Yet another is situated a few miles northwest of Grants (J. Judge, personal communication).

Plano Complexes

Occupation of the study area following Folsom is enigmatic. A temporal sequence

for the High Plains has been postulated. This sequence has been summarized by Irwin-Williams (n.d.a) as follows:

- Agate Basin (8300-7500 B.C.)
- Hell Gap (7500-7000 B.C.)
- Alberta (7000-6500 B.C.)
- Cody (6600-6000 B.C.)

The position of the Alberta complex in this sequence is questionable, since it may be restricted to the northern Plains. With the exception of Cody, these complexes are not clearly represented in the study area. Irwin-Williams (n.d.a; Irwin-Williams and Haynes 1970) notes a continued pattern of decreased moisture following Folsom times; this is interpreted as having led to reduced occupation in western New Mexico during Agate Basin, and to sparse or intermittent occupation in the area between 7500 and 6600 B.C.

The extent to which west-central New Mexico was abandoned between Folsom and Cody times remains to be determined. Irwin-Williams and Haynes (1970) believe there was an actual withdrawal of Plains-based hunting populations from the area. It is possible, however, that even if reduced moisture in the period led to reduced opportunities for hunting megafauna, other elements of a subsistence base would have remained intact, if not abundant. If so, then sizeable populations may have remained in the area following a subsistence strategy that did not concentrate on megafauna, and hence not producing the distinctive projectile points so consistently associated with megafaunal exploitation. Such populations would be far more difficult to recognize archeologically than would be the case if they were conveniently dropping lanceolate points about the landscape. The lack of archeological indicators of occupation between Folsom and Cody in the study area may, then, mean one of two things: either a lack of human population in the area, or simply a lack of commonly recognized indicators.

In any case, Judge (1973:69-72) has documented the presence in the Middle Rio Grande Valley of a megafauna-exploiting population which he places temporally between Folsom and Cody. Termed the Belen occupation, it has not been stratigraphically placed or absolutely dated, but it

does display technological similarities to the Plainview, Midland, and Milnesand complexes. Belen sites have only been documented from the area of Judge's survey, although other Plano complex sites are known from the Grants area (Agogino 1957b). The fact that the Belen complex has not been documented outside the Central Rio Grande Valley suggests that there may have been a local population in the area, permanently resident and sufficiently isolated from other regions that a distinctively local point form developed. The lack of recognizable Belen complex materials from other areas argues against the interpretation of population movements between the Plains and the Central Rio Grande (Irwin-Williams 1977b, n.d.a; Irwin-Williams and Haynes 1970).

Cody

The Cody complex is well represented in the area of the Middle Rio Grande Valley, but has not been documented in the central or western portions of the study area. Cody remains are widely distributed, a response to a period of greater moisture which began about perhaps 6700 B.C. (Irwin-Williams n.d.a). Cody complex remains have been consistently recovered in situations which suggest specialized bison hunting. Large-scale communal drives were practiced on the Plains, but would have been unnecessary in western New Mexico where bison herds could not have been very frequently so large. In addition to the diagnostic projectile points (Eden and Scottsbluff) the lithic assemblage features specialized end scrapers, raclettes, denticulates, notched flakes, and both bifacial and unifacial knives (Irwin-Williams n.d.a).

General Distribution

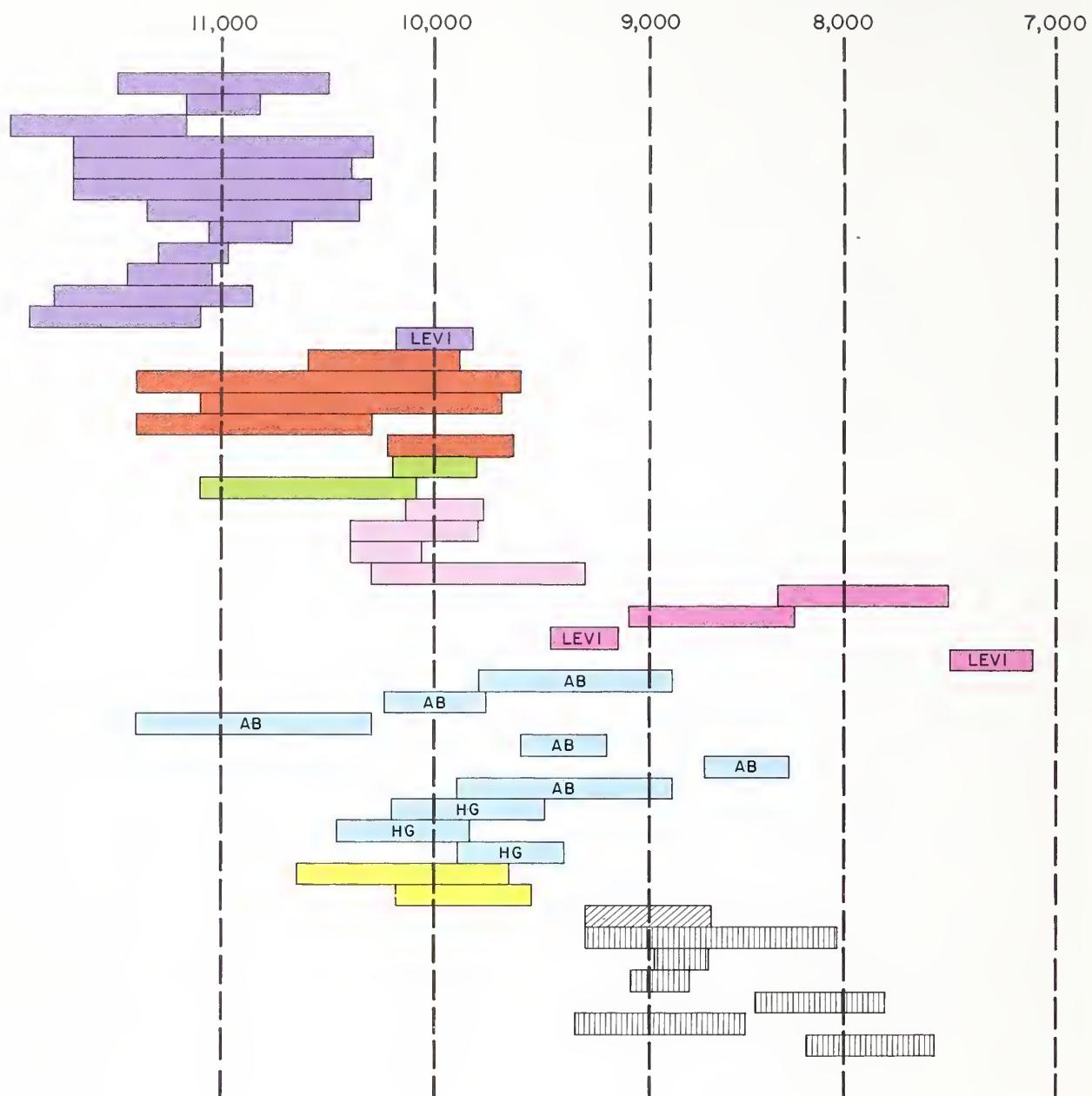
With the exception of the Middle Rio Grande Valley, the Acoma area, and the area around Grants, only isolated PaleoIndian projectile points have been found in the study area. This observation includes Cebolleta Mesa (Dittert 1959), the Zuni area (Dodge, Pearson, and Ferguson 1977), and the region north of Gallup (Beal 1978a). To the south however, in the Plains of San Augustin, and on the west side of the northern Ladron Mountains, PaleoIndian occupation was extensive (Berman 1979; G. Agogino, personal communication).

In his recent review of PaleoIndian manifestations in the Plains and the Southwest, Judge (n.d.) compiled all known radiocarbon dates. Cordell (1979:14) in turn plotted these graphically at one standard deviation. Cordell's illustration is reproduced here as Fig. 2. In analyzing these plotted dates, Cordell concluded:

The radiocarbon determinations, except for the temporal priority of Clovis, are insufficient for even minimal interpretation. There is no evidence for the sequential appearance of specific projectile point types (1979:13).

This is a startling observation, and one with major implications for PaleoIndian research. This being the case, it is an observation which should be scrutinized closely. With this in mind, I have taken the radiocarbon determinations reported in Judge (n.d.) and computed weighted averages for these for each complex. The weighting was based upon the accuracy of the determination, as reflected in the standard deviation. The procedures for deriving such weighted averages are described by Long and Rippeteau (1974). The radiocarbon determinations used to compute these averages are shown in Table 1. In this table I have used only those dates which were securely associated with a complex, and which were considered to be reliable radiocarbon assessments. The weighted average dates are shown in Table 2.

Next, t-tests were computed between all weighted averages to test for significant differences in radiocarbon age. The results of this test are shown in Table 3. In interpreting this table, three points should be kept in mind. First, this table should not be used as the sole basis for constructing a chronology. It may be used, however, to supplement stratigraphic information. Second, lack of a significant difference in radiocarbon age between two complexes does not indicate perfect contemporaneity. It may only indicate temporal overlap, as in Folsom-Midland. Third, significant differences in age do not mean that two complexes do not overlap in time, only that the averages of their radiocarbon ages are different. Thus, Folsom and Agate Basin appear to differ significantly, although at Blackwater Draw



LEGEND

[Purple Box]	CLOVIS	[Light Blue Box]	AGATE BASIN, HELL GAP
[Orange Box]	FOLSOM	[Yellow Box]	FIRSTVIEW
[Green Box]	MIDLAND	[Hatched Box]	ALBERTA
[Pink Box]	PLAINVIEW	[Vertical Striped Box]	CODY
[Magenta Box]	FREDERICK, LUSK		

RADIO-CARBON DATES PLOTTED
AT ONE STANDARD DEVIATION

Figure 2. PALEO INDIAN POINT TYPES & SERIES
(after Cordell 1979:14).

Table 1

PaleoIndian Radiocarbon Determinations, Plains and Southwest*

Site	Radiocarbon Years
<u>Clovis</u>	
Blackwater Draw - Locality I	11,040 ± 500 (A-490)
	11,170 ± 360 (A-481)
	11,630 ± 400 (A-491)
Dent	11,200 ± 500 (I-622)
Domebo	11,045 ± 647 (SM-695)
	11,220 ± 500 (SI-172)
Lehner	10,900 ± 450 (A-40b)
	10,940 ± 100 (A-375)
	11,170 ± 140 (K-554)
	11,240 ± 190 (A-42)
Levi Zone II	11,290 ± 500 (M-811)
Murray Springs	10,000 ± 175 (O-1106)
	11,150 ± 450 (A-805a)
	11,300 ± 500 (A-805b)
<u>Folsom</u>	
Blackwater Draw - Locality I	10,250 ± 320 (A-380, 379)
	10,490 ± 900 (A-386)
Brewster	10,375 ± 700 (I-472)
Lindenmeier	10,850 ± 550 (I-141)
Lubbock	9,883 ± 350 (C-558)
<u>Midland</u>	
Hell Gap	10,000 ± 200 (A-499)
	10,600 ± 500 (A-504)
<u>Plainview</u>	
Bonfire Shelter	9,920 ± 150 (Tx-657)
	10,100 ± 300 (Tx-658)
Plainview	10,230 ± 160 (Tx-153)
	9,800 ± 500 (L-303)
<u>Frederick</u>	
James Allen	7,900 ± 400 (M-304)
Hell Gap	8,600 ± 380 (A-501)
Levi	9,300 ± 160 (O-1129)
Greene	7,350 ± 150 (O-1128)
	7,880 ± 430 (WSU-630)
<u>Agate Basin</u>	
Brewster	9,350 ± 450 (O-1252)
Myers-Hindman	9,990 ± 225 (M-1131)
	9,400 ± 200 (GaK-2627)
Ray Long	8,459 ± 190 (GaK-2634)
	9,380 ± 500 (M-370)

Table 1 (continued)

Site	Radiocarbon Years
<u>Hell Gap</u>	
Casper	9,830 ± 350 (RL-125)
Hell Gap	10,150 ± 300 (A-500)
Sister's Hill	9,650 ± 250 (I-221)
<u>Firstview**</u>	
Olsen-Chubbs	10,150 ± 500 (A-744)
Portales Complex***	9,890 ± 290 (A-489)
<u>Alberta</u>	
Hudson-Meng	8,990 ± 190 (SMU-52)
<u>Cody</u>	
Hell Gap	8,600 ± 600 (I-245)
Horner	8,750 ± 120 (UCLA-697a)
MacHaffie II	8,840 ± 120 (UCLA-697b)
Lamb Springs	8,100 ± 300 (L-578a)
	8,870 ± 350 (M-1463)
	7,870 ± 240 (SI-45)

*after Judge (n.d.).

**The distinction of Firstview as a separate complex follows Wheat (1972) and Judge (n.d.). George Agogino has suggested (personal communication) that it is not a separate complex, but should instead be subsumed under Cody.

***George Agogino has suggested (personal communication) that the "Portales Complex" is not really a complex, but is merely a generalized term, much like "Plano," for post-Folsom PaleoIndian manifestations. This, coupled with the uncertainty concerning the status of Firstview, suggests caution in interpreting the averaged radiocarbon dates for Firstview.

Table 2
Weighted Averages of PaleoIndian Radiocarbon Determinations

Clovis	10,994 ± 63*
Folsom	10,251 ± 204
Midland	10,086 ± 187
Plainview	9,804 ± 103
Frederick	8,093 ± 101
Agate Basin	9,215 ± 106
Hell Gap	9,840 ± 171
Firstview	9,955 ± 267
Alberta	8,990 ± 190
Cody	8,665 ± 74

*This standard deviation may appear superficially to be low. The reader should keep in mind that it is a standard deviation of averages.

Table 3
Tests For Differences In Radiocarbon Age

	Clovis	Folsom	Midland	Plainview	Frederick	Agate Basin	Hell Gap	Firstview	Alberta	Cody
Clovis	-	<u>3.5*</u>	<u>4.6</u>	<u>9.8</u>	<u>24.4</u>	<u>14.5</u>	<u>6.3</u>	<u>3.4</u>	<u>10.0</u>	<u>24.0</u>
Folsom	-	-	0.6	<u>2.0</u>	<u>9.5</u>	<u>4.5</u>	1.5	0.9	<u>4.5</u>	<u>7.3</u>
Midland	-	-	-	1.2	<u>9.4</u>	<u>4.1</u>	1.0	0.4	<u>4.1</u>	<u>7.1</u>
Plainview	-	-	-	-	<u>11.9</u>	<u>4.0</u>	0.2	0.5	<u>3.8</u>	<u>9.0</u>
Frederick	-	-	-	-	-	<u>7.7</u>	<u>8.8</u>	<u>6.5</u>	<u>4.2</u>	<u>4.6</u>
Agate Basin	-	-	-	-	-	-	<u>3.1</u>	<u>2.6</u>	1.0	<u>4.3</u>
Hell Gap	-	-	-	-	-	-	-	0.4	<u>3.3</u>	<u>6.3</u>
Firstview	-	-	-	-	-	-	-	-	<u>2.9</u>	<u>4.7</u>
Alberta	-	-	-	-	-	-	-	-	-	1.6
Cody	-	-	-	-	-	-	-	-	-	-

*Value of t. Underlined values are significant at the .05 level. Values of t of 1.96 or greater are significant at the .05 level. Values of 2.58 or greater are significant at the .01 level.

they may have been contemporaneous (Judge n.d.:42).

This table must be treated as a first approximation. Its value is limited by the number of radiocarbon determinations available. However, it does suggest that the available PaleoIndian radiocarbon dates are sufficient for preliminary chronological interpretation and confirmation.

The Central Rio Grande Valley

The major study of PaleoIndian occupation in the overview area is Judge's (1973) survey of the Central Rio Grande Valley. In the Mt. Taylor overview area, Judge's survey included the West Mesa, Rio Puerco, and Rio San Jose areas (see Map 9.).

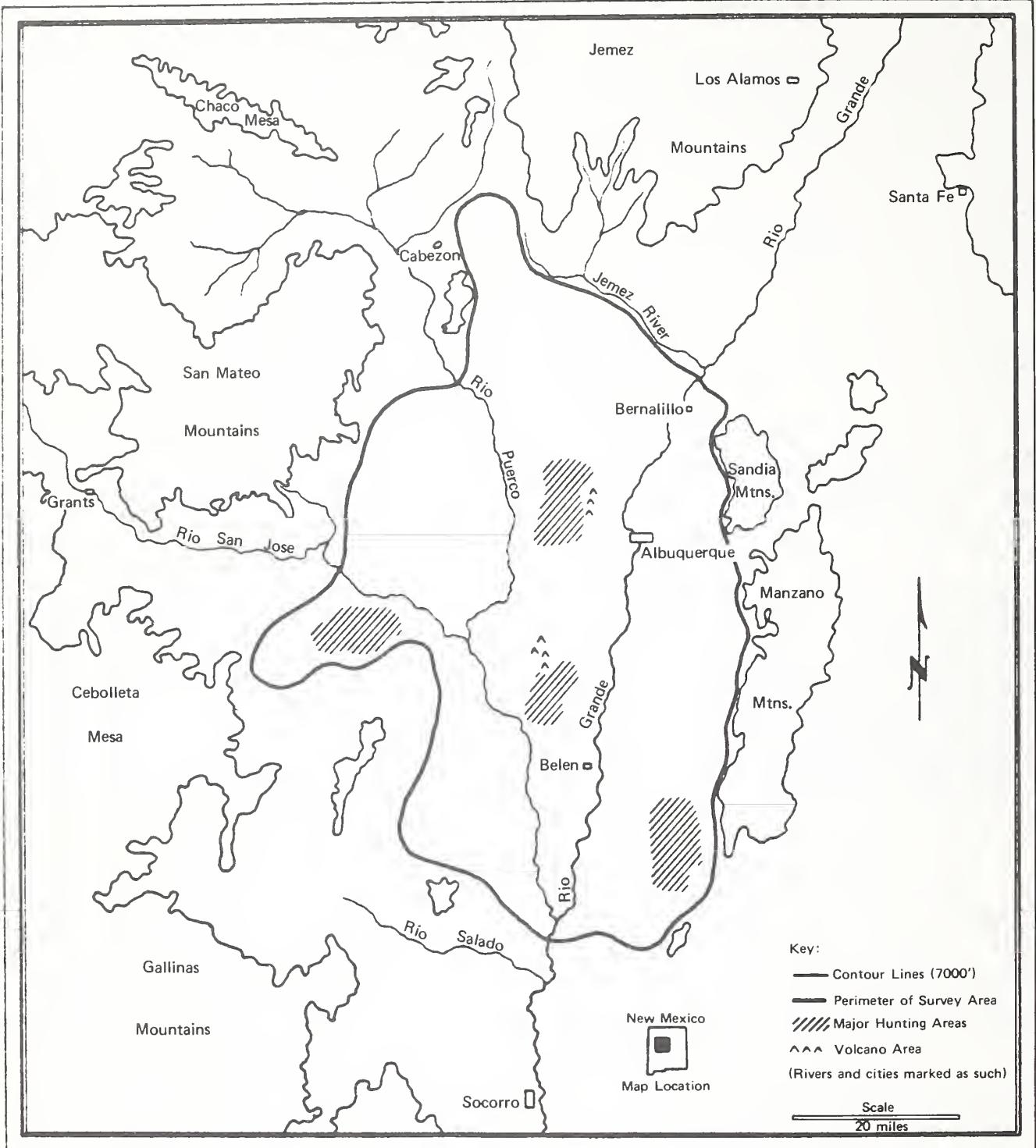
The area of Judge's survey consisted of approximately 300 square miles of plains and plateau type terrain. Its boundaries are defined by sharp topographic features, and form a nearly closed interior plateau with only six passages to exterior areas. Judge has suggested that, given the closed nature of the region, PaleoIndian hunters could have easily overexploited the Pleistocene megafauna of the area, with the result that some time would pass before herds would be replenished. This factor

would have had a serious impact on Paleo-Indian demography and subsistence patterns in the area.

Within the region there are four major areas, and several smaller areas, which exhibit a plains-like topography. These locations would have been suitable to support herds of grazing herbivores, and Judge has accordingly labeled these "hunting areas."

During the late Pleistocene the climate would have been cooler and moister than today. Winters would not have been appreciably colder, but summer temperatures were depressed by about 16 degrees Fahrenheit. Increased moisture led to the filling of small ponds and playas, and major drainages would have held water. Vegetation was mainly sage grassland, with pine and possibly some spruce along the higher mesas and escarpments. In the early human occupation several forms of megafauna, such as mammoth, horse, camel, and bison were present, but most of these became extinct rather early in the post-Pleistocene. By later periods only bison remained. Modern fauna, such as deer and antelope, were present throughout the period (Judge 1973:40).

Judge's survey of the region was not complete. Instead he followed a type of



Map 9. The Central Rio Grande Valley. Reprinted by permission from The PaleoIndian Occupation of the Central Rio Grande Valley in New Mexico by W. James Judge, copyright 1973 by W. James Judge.

sampling known as "site pattern recognition." This sampling procedure involved identification of the topographic features selected by PaleoIndians for site location, followed by intensive survey of these kinds of topographic features within the area. The results of this procedure were checked by a random sample of the area. Based upon this random sample, Judge (1973:53) estimates that 74 percent of all PaleoIndian sites in the area were in fact located. The distribution of located sites is shown in Map 10.

Judge distinguishes between two types of occupational loci: sites and localities. A locality was defined as any manifestation that yielded less than 2 percent of the total number of artifacts recorded for any particular complex (1973:62). This kind of distinction presents problems in cultural resource management (see Tainter 1980), in recognition of distinctive settlement types, and in data comparability. In regard to the last, it will suffice to point out that as the number of occupational loci increases, all other things being equal, the ratio of sites to localities will automatically decrease. The only condition where this will not occur is if there is a strong bimodal distribution in debris quantity. Consider the figures in Table 4, taken from Judge's study.

The Folsom occupation, with the largest number of occupational loci, shows the lowest site/locality ratio. Clearly this distinction between sites and localities produced results which are non-comparable. The implications for Judge's study may be serious, since he analyzed only the manifestations which met his definition of a site.

The Clovis Occupation

Only two Clovis occupational loci were found in the survey, and only one of these was designated a site. It was located on a shelf separating two arroyos. Other than this, little can be said about the Clovis occupation of the area.

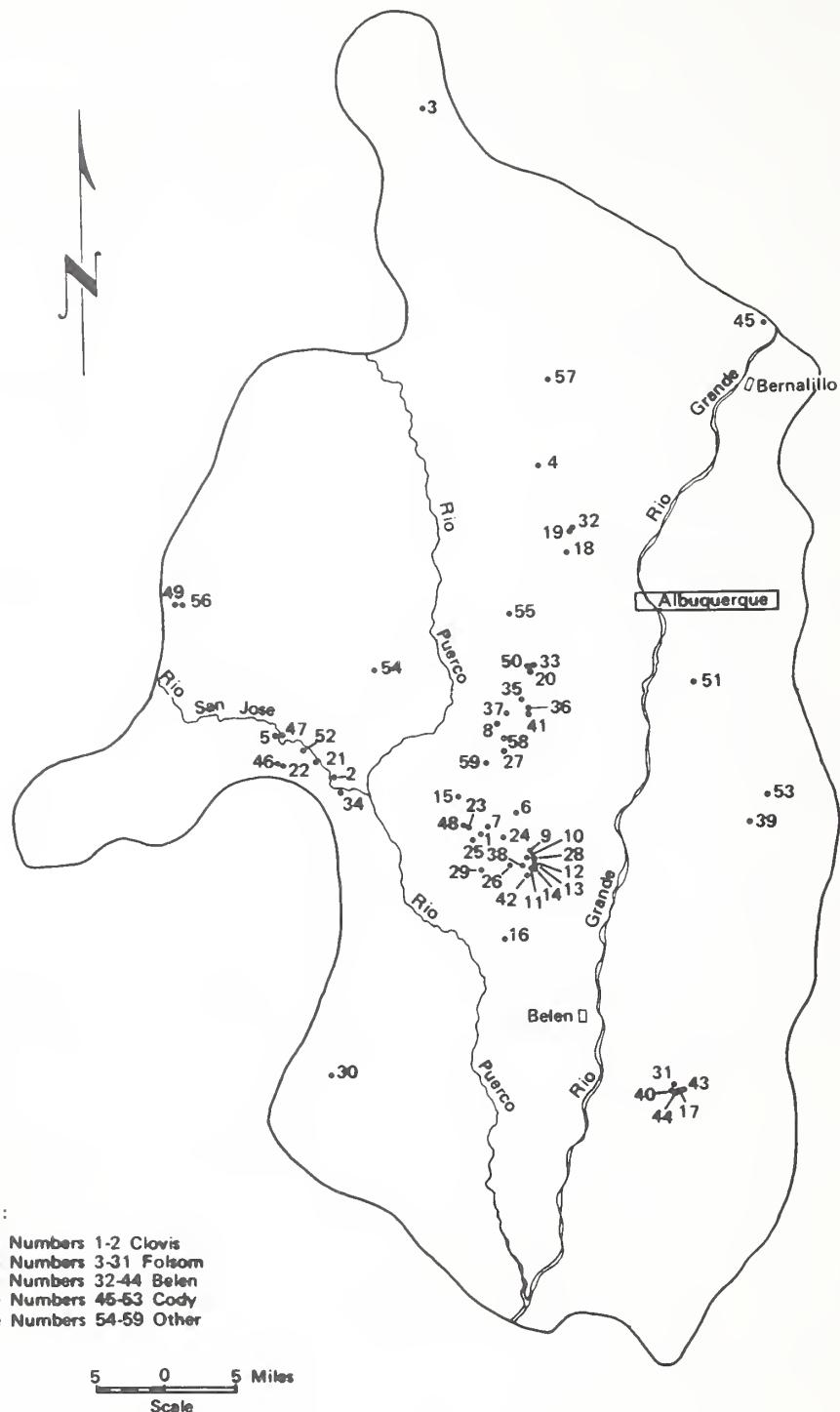
The Folsom Occupation

A total of fifteen Folsom sites and fourteen localities were recorded in the area. Folsom sites were located most frequently near playas as the nearest source of water (73 percent), with streams the nearest water source in the remaining sites. (Fully 94 percent of Folsom sites were near a playa, but it was not always the closest water source.) Average distance to water was 109 yards, the lowest of the four occupations with the exception of Clovis. Folsom sites were situated in respect to overviews from which game could be observed. Fully 40 percent of the sites were located on the overview itself, with the remainder an average of 73 yards away. All but one of the Folsom sites was situated so that the hunting area was to the south, and in 80 percent of the cases, the hunting area was to the southwest. The mean distance to the hunting area was 1290 yards. Most of the sites were located near one of the four major hunting areas (the largest plains-like areas). Potential trap areas (such as arroyos or lava tongues) were present in the vicinity of 74 percent of the sites.

The placement of sites to the northeast of playas suggests that the playas themselves were used as trap areas, with the hunters

Table 4
PaleoIndian Site/Locality Frequencies

Occupation	Sites	Localities	N	Site/Locality Ratio
Folsom	15	14	29	1.07
Belen	9	4	13	2.25
Cody	5	4	9	1.25



Map 10. PaleoIndian Sites In The Central Rio Grande Valley. Reprinted by permission from The PaleoIndian Occupation of the Central Rio Grande Valley in New Mexico by W. James Judge, copyright 1973 by W. James Judge.

downwind of the animals. (The prevailing wind direction is from the southwest.)

In analyzing the artifactual content of the Folsom sites, Judge (1973:197-210) produced a classification of the Folsom occupation: base camps, armament sites, and processing sites. Base camps ($n=3$) produced large numbers of implements, were located only in relation to major hunting areas, and were situated near and to the northeast of playas. Streams, however, were the nearest source of water.

Armament sites ($n=7$) were consistently located near an overview. The total assemblage reveals a primary concern with the preparation of weapons, particularly the final production of projectile points. Scrapers display hard wear, indicating working of hard materials.

Processing sites ($n=5$) were located in proximity to water, and displayed no concern for an overview. A high percentage of transverse scrapers displayed soft wear. Projectile point bases suggest weapon renewal rather than pre-hunt preparation. Activities such as hide processing and weapon renewal were apparently conducted at these sites following a successful hunt.¹

One Folsom base camp, the Rio Rancho site, has been excavated by Dawson and Judge (1969). The site contained at least five separate concentrations of Folsom artifacts. Dawson and Judge (1969:158) interpret each concentration as reflecting the localized activities of a family unit. Each concentration included firepits, both charred and unburned bone, evidence of projectile point manufacture and discarding of point bases, chisel gravers (probably used in shaping atlatls), and both large and small butchering and hide scraping tools. No vegetal processing implements were found.

No large skinning knives or complete projectile points were found in the debris concentrations, although both were present in trash deposits. This suggests that killing, skinning, and dismemberment of game largely occurred elsewhere. The presence of hide scraping tools and small flake tools indicates that secondary animal processing may have taken place in or near the debris concentrations. Finds of implements like spokeshaves suggest repair and manufacture of handles, shafts, and other

equipment. The raw materials used to make stone tools were obtained locally. Dawson and Judge (1969:159) advance the interesting observation that the tool manufacturing techniques and style suggest occupation of the site by two distinct social groups.

The Belen Occupation

A total of nine sites and four localities were assigned to the Belen complex. The sites are frequently found near playas, but do not show the same concern for playa location as the Folsom sites did. Some 67 percent of the Belen sites used playas as the closest source of water, 22 percent were near streams, and one site was situated on a ridge near a spring. The mean distance to water was 160 yards.

Belen sites show greater concern with the overview factor than Folsom. A total of 56 percent of sites were located at the overview itself, the highest percentage in the sample. Furthermore, mean distance to the overview was lowest for all occupations (53 yards).

Belen hunters were less concerned with using the major hunting areas, and increasingly utilized the minor ones. Some 55 percent of the sites were located near these. Average distance to hunting areas was 1395 yards, somewhat greater than Folsom. There was less concern with being situated at the northern end. Potential trap locations were less consistently selected.

As with the Folsom sites, three categories of settlement were evident in the Belen data: base camps ($n=2$), processing sites ($n=3$), and armament sites ($n=4$) (Judge 1973:210-234).

The Cody Occupation

Five sites and four localities were attributed to the Cody complex. Most of the sites were near streams as the closest source of water. Playas were not as important as earlier. The mean distance to water was 444 yards, the largest in the survey sample.

Two of the Cody sites were located at an overview. Average distance from site to overview was 80 yards. The average

distance to the hunting area was 2550 yards, the largest of the sample. The hunting area was always to the Southwest. Trap areas, mostly arroyos, were present near all sites.

The Cody settlement pattern is distinctive and, because of the low sample size, difficult to characterize (Judge 1973: 247-256).

Comparative Analysis

Occupation of the survey area by Paleo-Indian groups was probably seasonal and of short duration. Given that restricted access to the region would have prevented rapid replenishment of depleted game herds, the region may have been used by Paleo-Indian hunters only periodically.

The PaleoIndian occupation of the Central Rio Grande Valley displayed a settlement pattern with broad regularities. All sites, from all occupations, were near a source of water which would have attracted game in addition to satisfying human needs. All sites were within a relatively short travel time from a hunting area. Finally, all the sites were found at or near an overview.

The Folsom pattern is distinctive in that it is based on close proximity to water, and also in the important role played by playas. Folsom sites are about the same distance from an overview as Cody sites, and somewhat more distant than Belen. Folsom sites are on the average closer to hunting areas, generally the major ones.

Belen sites are generally farther from water than Folsom. Most distinctively, the Belen occupation displays the greatest association with overviews. Belen sites are slightly more distant from hunting areas than Folsom, with a majority located near minor hunting areas.

Cody sites were located farthest from hunting areas. There was a strong de-emphasis of the playa as a desireable site location. Most of the nearest sources of water were streams.

In general, then, the progression from Folsom to Cody in this area displays a shift from an emphasis on locations with specific relationships to a major hunting area (Folsom), to an increased distance from the hunting area with less concern for

specific relationships to it. There is a general increase through time in the distance to the nearest source of water, and the playas became increasingly less important. Finally, there is a general increase in the elevation of sites, and an accompanying emphasis on the proximity to an overview situation (Judge 1973:314-315).

Judge suggests that the key to explaining these changes is the critical variable of water (1973:315), crucial for supporting large herds of game animals in the area. Moisture conditions during Folsom times were probably sufficient to maintain the playas as good sources of water. In turn, these features would have supported both game animals and the Folsom hunters dependent upon them. By Cody times, however, moisture conditions in the area had deteriorated to the point where playas were no longer adequate sources of water, and the animals in turn would seek out streams, rivers, and springs. Belen sites might well represent an intermediate position.

PaleoIndian Research Problems In The Study Area

In her recent overview of the Middle Rio Grande Valley, Linda Cordell (1979:17) listed a number of problems involved in the study of the PaleoIndian phenomenon. These problems, which also apply to the present study area, include 1) geological processes which have covered early remains, 2) the ephemeral nature of archeological remains left by mobile, low-density hunters and gatherers, 3) relative scarcity of diagnostic indicators of PaleoIndian occupation, and 4) lack of detail in paleoenvironmental reconstruction. Cordell points out that Middle and Upper Paleolithic archeology in Europe, despite facing these same problems in magnified form, has nevertheless produced considerable knowledge. Each of these problems remains to be tackled in the Mt. Taylor area. Despite the success of Judge's (1973) survey, Cordell (1979:133) has pointed out that areas where PaleoIndian sites have been found in New Mexico are those areas which have been sufficiently eroded to expose remains. Thus, the relative absence of known PaleoIndian remains from the central and western portions of the study area may reflect only the fact that these areas are less severely eroded than the Rio Puerco-West Mesa area. One area of apparent erosion which might be

more intensively investigated for Paleo-Indian remains is the Zuni Reservation (cf. Cordell 1979:134).

Given the importance to PaleoIndian hunters of now-extinct herbivores, the kinds of habitats where these fauna would have lived should be investigated for early remains. The North Plains, southwest of Grants, would be a logical place to look. As noted above, one Folsom site has already been documented in this area. Its setting suggests that elevated topographic features in this area might be expected to yield comparable materials, although this type of site will be only a limited sample of the range of PaleoIndian materials in the region.

Subsistence-Settlement Systems

A major, unresolved question concerning PaleoIndians is the extent to which their subsistence base was in fact a focal one, specializing in the hunting of megafauna. Both Judge (n.d.) and Irwin-Williams (n.d.a) believe that this is so, although admitting minor additions to the diet from other sources. Wilmsen (1970), in contrast, based upon analysis of stone tools, would suggest a broader diet during the PaleoIndian period.

When viewed in an abstract sense, the idea that PaleoIndians concentrated on megafaunal exploitation is difficult to accept. In an ethnographic survey of hunters and gatherers around the world, Lee (1968) found overwhelming emphasis on plant resources among most groups not living in the arctic. Cordell (1979:20), following Binford's suggestion that outside of the tropics, all hunters and gatherers are perfect generalists (that is, take food in proportion to its abundance in the environment), doubts that Clovis hunters were so anomalous. The case for hunters and gatherers being perfect generalists is perhaps a bit overstated. Naturally occurring foods vary in the amount of effort required to procure and process them; this fact alone suggests that, on a daily basis, foods will never be taken in proportion to their abundance in the environment. Nevertheless, it is clear that outside of the arctic, hunters and gatherers are not expected to concentrate so exclusively on a single faunal resource.

This will have especially been the case in topographically diverse western New Mexico, compared with the more homogeneous Plains. In the Mt. Taylor area topographic diversity would have provided closely juxtaposed resource zones which could have been conveniently exploited with minimal travel. Considering this, it is not surprising that Clovis points have been found at high elevations in northern New Mexico and Colorado (Cordell 1979:11-12). The topographic diversity of western New Mexico has been overlooked by scholars who see the area as merely an extension of the Plains PaleoIndian adaptation.

That megafauna would have been attractive to early hunters is indisputable. The large size of these animals would have provided substantial food with minimal effort. To achieve a "harvest" of smaller animals or vegetal foods of equal gross weight would have required far greater effort. Yet this fact does not by itself lend credibility to the notion of a focal economy. As Judge (1973) has pointed out, depletion of game herds in the Central Rio Grande Valley would have been a recurrent problem. This depletion could result from either excessive hunting or from climatic stress. Irwin-Williams (1977b, n.d.a; Irwin-Williams and Haynes 1970:65) would see the response to such depletion as the actual withdrawal of hunting populations to the Plains, with return to the western area during more favorable periods. There are some logical problems with this interpretation. During periods of climatic stress, migration of Rio Grande PaleoIndian hunters to the Plains might have resulted in encroachment on resident populations already faced with resource shortages. These encroachments would then have been resisted. If such encroachment did not precipitate or aggravate a local food crisis, then the megafaunal resources of the Plains must have been of such magnitude that expansion into areas to the west, which were apparently marginal for megafaunal hunting, would have been unnecessary. Thus, fluctuations in the supply of megafauna in western New Mexico logically cannot explain the occupation and abandonment sequence which Irwin-Williams (1977b, n.d.a; Irwin-Williams and Haynes 1970) postulates.

More likely, PaleoIndian populations in western New Mexico were permanently

resident, and pursued a mixed subsistence strategy which included both smaller fauna and vegetal foods. During periods of megafaunal depletion, and indeed at all times, such resources formed the major elements of the subsistence base.

Actually, data from Judge's survey substantiate this argument. Based upon his probability sample, Judge (1973:53) estimates that the area may contain 80 PaleoIndian occupational loci. This is probably a low estimate. Let us assume that this figure represents only 10 percent of the Paleo-Indian sites in the area, and that each of the 800 postulated sites represents a megafaunal kill. These are, of course, generous estimates, unrealistically generous, especially since Judge found three settlement types. Then, with about three thousand years of potential Paleo-Indian occupation in the area, there would have been .27 kills per year, or about one kill every four years. Judge (1973: 308-309) has estimated that the area may have contained from 12 to 24 Folsom bands. I will use the lower figure. It is difficult to see the produce of one megafaunal kill lasting more than two months (assuming the meat was dried), given the postulated focal economy. If the twelve bands were operating and feeding independently, then they would have needed 72 kills per year, or 288 every four years. Yet the archeological record indicates no more than one every four years. In this case, megafaunal exploitation can only account for 0.3 percent of food consumption days. However, lack of sharing would be unexpected in a hunting and gathering society. If the twelve bands practiced perfect sharing, then given the figures set forth above, megafauna can account for 4 percent of food consumption days, or about 15 days per year! At that rate, over a four year cycle, this population would have needed 24 alternate locations in which to hunt megafauna. This last figure assumes the 12 bands moved as a single unit. If they did not, then as many as 288 alternate hunting locations would have been needed. Yet it is difficult to see where this population would have found 24 alternate hunting locations equivalent in potential to the Central Rio Grande Valley, especially since surrounding areas already sustained Paleo-Indian populations (Lyons 1969; Berman 1979), who would have similarly been coping with potential kill rates of only once every four years or so. And unless the

archeological record of these areas surrounding the Central Rio Grande Valley reflects the movements of but a single PaleoIndian group, wandering about an empty landscape in west-central New Mexico, which is not a likely possibility, then it is difficult to see how a focal economy could have been maintained.

It is reasonable to ask, then, why hasn't evidence of a more diversified subsistence base been found? The answer, pointed out on numerous occasions, is that other subsistence activities may not have resulted in the deposition of diagnostic implements. If PaleoIndian projectile points were specialized tools, linked to megafaunal exploitation, then such points may not have been used in other portions of the subsistence round. Two archeological impressions would result from this: first, that Paleo-Indians did not practice a diversified economy, and second, that during periods of megafaunal depletion, the area was uninhabited. I have argued in this section that these impressions are logically questionable.

Thus, one of the most pressing problems in PaleoIndian research in this area (and elsewhere) is to be able to identify Paleo-Indian sites which were not used for megafaunal exploitation. Clearly, a program of absolute dating is called for. In fact, Cordell (1979:21) has suggested the use of obsidian hydration dating, and identification of diagnostic reduction processes, for locating PaleoIndian remains. If, through absolute dating, a PaleoIndian subsistence-settlement system could be delineated, and the environmental parameters of settlement identified, then a purposive sampling program such as Judge used might be employed to identify probable PaleoIndian settlements throughout the study area. Judge (1973) has convincingly demonstrated that the PaleoIndian sites in his survey area were related to megafaunal exploitation. Hence, the areas to look for other kinds of PaleoIndian settlements would be the higher terrain surrounding the Rio Puerco-West Mesa area. Sandia Cave is, of course, located in such terrain.

Given the possibility that PaleoIndian populations resided permanently in the study area, the question arises whether the close juxtaposition of resource zones, resulting from topographic diversity, would have led to sedentism and consequent

population growth. The answer is that, with the cooler temperatures and reduced growing season characteristic of the early post-Pleistocene, this would not have been possible. Following the Pleistocene, climatic zones have migrated northward, so that climatic conditions obtaining in the northern Rockies today are generally similar to those of the study area during the PaleoIndian occupation (Harris and Findley 1964:118). Ethnographic groups resident in the northern Rockies in historic times were not able to maintain the kinds of sedentary settlements found, for example, on the Pacific Coast. It may be assumed that PaleoIndian groups in the area were relatively mobile, although undoubtedly less so than Plains populations. Certainly no very large PaleoIndian settlements have been found in the study area.

The PaleoIndian/Archaic Transition

The nature of the transition from Paleo-Indian to Archaic in the study area remains to be resolved. It has commonly been suggested that the Archaic period represents a readaptation to drier climatic conditions, in which the kinds of megafauna utilized by PaleoIndians were no longer available. The Archaic economy, then, is thought to have been more diversified and generalized than the PaleoIndian one. But as pointed out, the degree of diversity in PaleoIndian economies remains to be determined.

Cynthia Irwin-Williams (n.d.a) has suggested that after the disappearance of the Cody complex, there was no further occupation of the Southwest by Plains-based hunting-oriented groups.² She sees no evidence for any direct connection between terminal PaleoIndian and early Archaic populations, nor for the derivation of the latter from the former. In the Arroyo Cuervo region, Irwin-Williams (n.d.a) notes that the early Archaic Jay phase (5500-4800 B.C.) differs so greatly in tool kit, settlement patterns, and other aspects from the preceding Cody complex that there appears to be no connection between them. Instead, similarities are seen to the contemporary or immediately antecedent San Dieguito/Lake Mojave remains in California and eastern Arizona, leading Irwin-Williams to postulate slow demographic movements from the west into New Mexico. In this manner, new populations occupied the territory left

empty by the withdrawal of the PaleoIndian groups (n.d.a; cf. Glassow 1972a:295).

There are a number of assumptions in this argument which need to be made explicit. These include the following:

1. that lithic tools are indicators of socio-ethnic differentiation,
2. that abrupt changes in lithic assemblages, settlement patterns, and the like reflect population replacement,
3. that hunting and gathering populations do not make rapid, pronounced adaptive changes, and
4. that the area was, indeed, occupied by Plains-based Paleo-Indian hunting groups.

We have seen that there are reasons for doubting the extent to which PaleoIndian groups were focused on big game, and for wondering whether the postulated population movements between the Plains and the Rio Grande did in fact occur. As pointed out in the previous chapter, the only way to demonstrate population replacement in the archeological record is through the biological characteristics of the populations themselves. It would appear that, at the minimum, alternative interpretations of the PaleoIndian/Archaic transition need to be formulated.

THE EASTERN SUBAREA

The major research in the eastern subarea has been conducted by Cynthia Irwin-Williams of Eastern New Mexico University in the upper Rio Puerco-Arroyo Cuervo region. In this area, several years of research in the Archaic period has resulted in the establishment of the best documented Archaic sequence in New Mexico. More importantly, Irwin-Williams' work in this area has concentrated on explaining cultural change throughout the Archaic period.

The Archaic

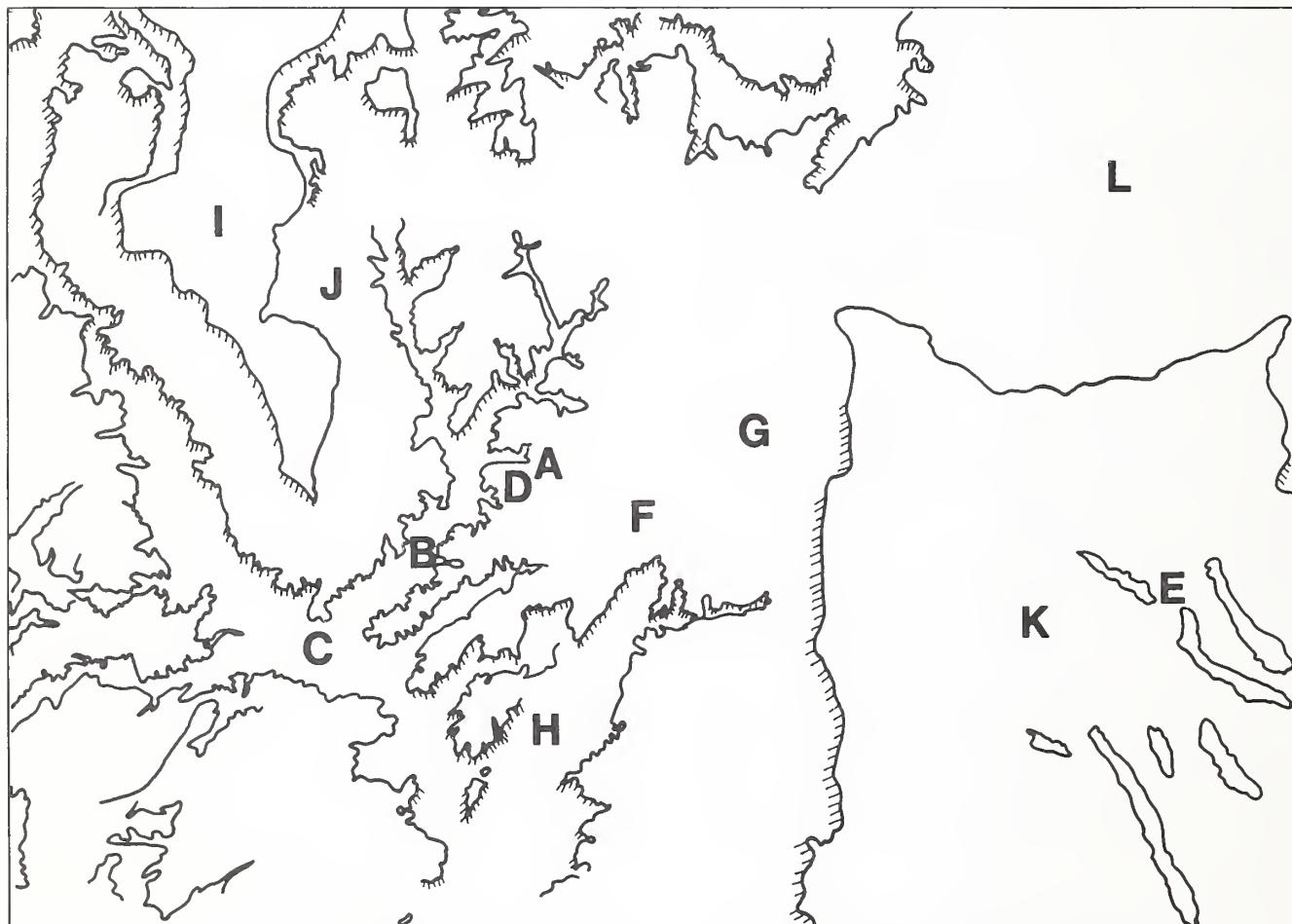
One of the major areas of Archaic settlement in the eastern subarea was the Arroyo Cuervo, a tributary of the Rio Puerco. The

Arroyo Cuervo contains at least 25 recognized microenvironments, which vary with topography, pedology, and altitude. Of these, 12 were relevant to the Archaic occupants of the area. These are A) canyon rims, B) canyon bottoms, C) valley floors, D) springs, E) dune ridges, F) ephemeral ponds, G) low mesa land, H) isolated mesa tops, I) Mesa Prieta, J) Mesa Prieta slopes, K) Ceja upland (faulted uplands rising steeply east of the Arroyo Cuervo), and L) Ceja slopes (Irwin-Williams 1973:3). The distribution of these zones is shown in Map 11.

Maximum utility of the resources available in these zones occurs in the period March through November. Most useable plant

species occur in a dispersed pattern, with some overlap. Faunal resources are equally dispersed, with deer concentrating in more wooded areas, and antelope on the eastern grassy plains. Other faunal resources of the area are small in size. There are a limited number of permanent water sources, mainly seep springs at canyon heads where several productive microhabitats (A, B, D) come into proximity (Irwin-Williams 1973:4).

As noted in the previous chapter, Irwin-Williams (n.d.a) believes there was an occupational hiatus in the area between PaleoIndian and Archaic, that populations from the west moved into an area left vacant by withdrawal of PaleoIndian groups.



Map 11. Preliminary Map of Microenvironments In The Arroyo Cuervo Region (after Irwin-Williams 1971). Reproduced by permission of Cynthia Irwin-Williams.

The Archaic sequence generated by these new populations has been termed by Irwin-Williams (1973) the Oshara Tradition.

Jay Phase (5500-4800 B.C.)

The Jay phase represents the earliest Archaic occupation of the Arroyo Cuervo region. Most sites of this phase are located in sheet sand deposits on cliff tops in the canyon head complex (zones A, B, D). In the southern area a few sites are located near ephemeral ponds (F). Some lithic scatters and isolated points are found on low, sloping mesas (G). Outside of the Arroyo Cuervo region two types of Jay phase sites have been found: hunting camps in the Jemez Mountains, and quarry-workshops near good quality basalt outcrops.

The canyon head sites are small, with thin, scattered debris. The full range of seasonal activities is represented in these sites, which were apparently periodically revisited.

The Jay phase tool kit includes large, slightly shouldered projectile points which are reminiscent of the Lake Mojave points of California and Arizona (Fig. 1). Other items include well-made lanceolate bifacial knives and numerous, very well-made side scrapers. Both hard and soft hammer percussion was employed. No equipment for breaking or grinding seeds or nuts has been found.

The Jay phase was characterized by a mixed-spectrum subsistence pattern, featuring year-round exploitation of resources accessible from permanent water sources (Irwin-Williams 1973:4-5).

Bajada Phase (4800-3200 B.C.)

The period of the Bajada phase was characterized by decreased moisture conditions. Despite this, archeological sites of this period are more numerous and there appears to have been a slight increase in population.

The settlement pattern of the Bajada phase was similar to that of the preceding Jay phase. Base camps were located at canyon heads (zones A, B, D), while scattered, special-use sites have been found on the

adjacent sloping mesas and along canyon rims (A). Rare, isolated hunting sites occur near ephemeral ponds (F). Quarry sites are found in the Jemez Mountains and elsewhere. The isolated foraging camps on the mesa slopes and canyon rims are all located within less than five miles of the canyon head base camps.

The Bajada phase projectile point form shifts from an early variety, distinguished from Jay points by the presence of basal indentation and basal thinning, to a later variety with increasingly well-defined shoulders and decreased overall length. Other elements include well-made side-scrapers and rare bifacial knives. There are increased numbers of large chopping tools and poorly made sidescrapers on thin, irregular flakes. Experimentation indicates that the latter are suitable for processing coarse plant foods such as yucca hearts, cactus roots and joints, and the like (Irwin-Williams 1973:6-7).

San Jose Phase (3200-1800 B.C.)

The San Jose phase witnessed considerably increased effective moisture along with dune stabilization and soil formation. As a result, the number and reliability of springs increased, while the floral and faunal resource base improved. There is a notable increase in the number and size of sites, particularly in the canyon head area (zones A, B, D). There are a few low-density sites of this phase on the pond edges (F) south of the Arroyo Cuervo, and several specialized hunting sites are known.

Base camp debris is both more concentrated and more extensive than in the Bajada phase. At one site a circle of five hearths was found. At a hunting site fifteen hearths were present, suggesting a large, special activity group. Post hole patterns suggest temporary structures. Extensive earth ovens have been found filled with fire-cracked rocks.

The tool kit is dominated by increasing numbers of poorly made sidescrapers on thin flakes, and large, heavy chopping tools. The earlier, well-made sidescrapers are rare and bifacial knives nearly absent. Projectile point form is similar to late Bajada, but with increased serration and relatively smaller blade to stem ratio.

Important additions to the tool kit are shallow-basin grinding slabs and simple cobble manos. Pounding stones are common. Large subsurface or surface ovens, usually filled with cobbles, came into use.

The inclusion of simple grinding tools in the tool kit suggests the utilization of seeds and nuts. In general, the subsistence base was mixed, with resource exploitation being systematic, intensive, and inclusive. The climatic amelioration, coupled with the development of the technology for preparing seeds and nuts, have been suggested by Irwin-Williams (1973:9) as the reason why population increased during this period. Population pressure, however, had not reached the point of causing social or economic stress (Irwin-Williams 1973:7-9).

The question of whether the shift to exploitation of seeds and nuts caused, or was caused by, population increase, cannot be resolved with available data. However, it was pointed out in a previous chapter that, under the Principle of Least Effort, human populations are expected, at any point in time, to exploit those resources which give the most return for the least effort. This being the case, it follows that any shift in subsistence practices will have to be in the direction of exploiting resources which, because of greater difficulty in collection, transport, and/or processing, give less return per unit of effort. This would have been the case with the seeds and nuts exploited during the San Jose phase. Since a human population will not capriciously shift to resources which require greater work per unit of return, it would seem likely that the exploitation of seeds and nuts during this phase was a consequence rather than a cause of population growth. The low degree of seasonal mobility, established as early as the Jay phase, would have precipitated population growth in the early Archaic. This growth is clearly evident in the archeological record of the Arroyo Cuervo region.

It is during the third millennium B.C. that the Southwest first becomes recognizable as a cultural entity. This entity has been termed the Picosa complex (Irwin-Williams 1967) from the major archeological units which comprise it: Pinto Basin, Cochise, and San Jose. Irwin-Williams (n.d.a) suggests that this phenomenon reflects the

development of a large-scale, low-level communication network.

Armijo Phase (1800-800 B.C.)

The Armijo phase witnessed significant changes in patterns of land use, technology, and seasonal structure. Moisture fluctuated throughout the period, but was generally lower. For the first time, limited quantities of maize were grown in the narrow flood plains near the canyon head springs (zones A, C). This provided only a small increment to the diet.

In most aspects the Armijo phase settlement pattern was a continuation of that of previous phases. Base camps were still located above the canyon heads (zones A, B, D). These sites contain irregular post hole patterns, large pits of fire-cracked rock, and some evidence of patterned work areas. The ephemeral ponds (F) were only slightly used, with more intensive use of the Jemez Mountains. Scattered projectile points and seasonal camps are found in areas adjacent to canyon heads (A, G).

There is, however, a new settlement type, the first example of seasonal population aggregation. This type of settlement is best represented at Armijo Shelter, a rockshelter located at a canyon head near the best of the seep springs. The occupation of Armijo Shelter was extensive. There was repeated occupation by sizeable groups which produced large, cobble-filled ovens and dense occupation floors. Paleo-botanical and hydrological studies indicate a fall or fall/winter occupation. The shelter contains a wider range of tool classes than the contemporary cliff-top sites. Included in these tools are items reflecting ritual activites, found only at Armijo Shelter.

Armijo Shelter reflects the beginning of a seasonal pattern of population aggregation. Groups of 30 to 50 individuals, from several social groups, would gather at this location in the fall to participate in larger scale social and ceremonial activities. When these were concluded, the population would disperse to the smaller clifftop sites.

Irwin-Williams (1973:11) believes that the stimulus for this aggregation was the

availability of a small maize surplus in the fall. There are reasons to question this interpretation.

As pointed out previously, complex social and ritual systems have higher energy costs per capita than do less complex ones. The increase in social and ritual complexity associated with population aggregation at Armijo Shelter cannot be accounted for merely by the availability of a surplus to support an aggregated population. Some factor must account for this population's willingness to bear the increased costs (such as temporary support of ritual specialists, sharing of harvested resources, increased social conflict) associated with increased complexity. The increased population noted by Irwin-Williams throughout the Archaic may account for both the shift to maize cultivation, minimal as it was, and for the increased social and ritual complexity associated with the maize harvest. Ford (1972) has shown that, among recent Puebloan groups, ritual activities were often associated with resource distribution, and served to even out variations in harvests enjoyed by individuals and social groups. The increased social and ritual activity at Armijo Shelter may have served a similar purpose. Without such a purpose being served, there would have been no need for population aggregation, for each group could have independently collected its own fall harvest and proceeded to prepare for winter.

With the exception of ritual paraphenalia, the Armijo phase tool kit was largely a continuation of trends from the preceding phase. Projectile points show variation throughout the period (Irwin-Williams 1973:9-11).

In other portions of the eastern subarea, the Santa Ana sites, reported by George Agogino (1952, 1960; Agogino and Feinhandler 1957; Agogino and Hester 1953) are suggested by Irwin-Williams (n.d.a) to be similar to the Armijo phase sites in the Arroyo Cuervo. This would suggest that the Jemez River is a suitable place to test whether the patterns discerned for the Armijo phase in the Arroyo Cuervo were duplicated by similar processes elsewhere. The Atrisco complex, reported by Campbell and Ellis (1952) south of the West Mesa volcanoes, is also similar.

En Medio Phase (800 B.C.-400 A.D.)/ Trujillo Phase (400-600 A.D.)

The En Medio phase presents the first archeological materials recognizable as Anasazi-Pueblo. It is essentially equivalent to manifestations termed Basketmaker II elsewhere in the Anasazi area. The Trujillo phase is equivalent to early Basketmaker III.

A regional population increase is evident during these phases, reaching a peak in the first few centuries A.D. There was a shift to sharply demarcated seasonal camps. Localities of population aggregation, like Armijo Shelter, multiplied. A seasonal counterpart of the seasonally occupied cliff-base camps was established on dune ridges (E). These are small, special activity camps characterized by thin, sparse refuse, large, shallow storage pits, fire-cracked rock concentrations, patterned work areas, and possibly simple shelters. The tool kit at these sites (ground stone tools and utilized-flake cutting tools) reflect gathering and processing of plant products. These dune areas support a high concentration of grasses, cacti, yucca, amaranth, chenopod, and junipers (which produce edible berries). These resources are most productive between April and September. Water, however, is not readily available.

There was continuity in tool kits from preceding phases, but with increasing frequencies of ground stone tools. The functional and stylistic range of the tool assemblage was expanded. Earlier, populations used deep-basined grinding slabs and cobble handstones, shifting later to both flat and trough metates and long, flat manos.

Two major developments during the Trujillo phase were the initial use of pottery, and the bow and arrow. Glassow has suggested that pottery was employed in the Southwest for the purpose of reconstituting and cooking dried maize, while the bow and arrow was developed to compensate for increased time required for agricultural pursuits (1972a:297-298).

The En Medio and Trujillo phases reflect the development of a strong pattern of seasonal transhumance. Armijo Shelter remained the focus of maximum population

aggregation, and was the only site with ritual artifacts. Populations would disperse from Armijo Shelter to the numerous, smaller, cliff-base shelters, such as En Medio Shelter (Irwin-Williams and Tompkins 1968). As these canyon head locations became saturated, their continued occupancy required the collection and storage of resources from a broader territorial base. Thus, the settlement pattern was expanded to include the dune ridges (Irwin-Williams 1973:11-15).

Archaic Occupation of the West Mesa

The Albuquerque West Mesa, or Llano de Albuquerque, is a long, narrow plain that extends from the Jemez River to a point about twenty miles south of Albuquerque (Rodgers 1978:4). It forms the eastern boundary of the Mt. Taylor overview area. The northern part of the West Mesa adjacent to the city of Albuquerque forms a steep escarpment above the Rio Puerco, with a more gradual descent to the Rio Grande on the east. It is in this portion of the West Mesa that archeological work has concentrated.

The West Mesa is basically a desert grassland biome, exhibiting a variety of grasses, forbs, and cacti (Rodgers 1978:9). It contains no permanent water, only catchment basins and intermittent playas (Reinhardt 1967a:13).

Archeological research on the Archaic occupation of the West Mesa has been conducted by Reinhardt (1967a, 1967b, 1967c) and by Campbell and Ellis (1952). In a purposive survey around the area of the Rio Rancho development, Reinhardt (1967a) delineated a cultural/temporal sequence spanning the interval between pre-1000 B.C. and A.D. 500. Three phases were observed:

Atrisco phase, pre-1000 B.C. (temporally equivalent to Irwin-Williams' [1973] Armijo phase);

Rio Rancho phase, 1000-1 B.C. (equivalent to the late Armijo and early En Medio phases);

Alameda phase, 1 B.C.-550 A.D. (equivalent to the late En Medio and Trujillo phases).

This sequence must be regarded as tenuous, since it is pegged by only three radiocarbon dates.

The Atrisco phase is not well known, in part because many of the sites may still be buried. Reinhardt (1967a:209) suggests that it is "related" (that is, possessed sociocultural affinity) to the San Pedro phase of the Cochise. Dwellings are not known for this phase, and the emphasis of the documented material seems to have been on hunting (Reinhardt 1967a:114, 220).

The succeeding Rio Rancho phase represents the most intensive occupation of the West Mesa. It is a local manifestation of Basketmaker II, with an apparent emphasis on hunting. Remains of pronghorn antelope, small mammals, birds, and rodents have been recovered archeologically. Grinding implements are not common. Reinhardt (1967a: 232) feels that the abrupt appearance of the Rio Rancho phase hunting-oriented population reflects a movement from the south into the Rio Grande Valley after 1000 B.C. He suggests that shifting precipitation patterns may have stimulated this movement. Rio Rancho phase material has been found in the Rio Puerco Valley, the Santa Ana Pueblo area, the Albuquerque East Mesa, the southern portion of the West Mesa, and the area southeast of Placitas.

Irwin-Williams' synthesis of the Archaic occupation of the Arroyo Cuervo region (1973) had not been published when Reinhardt completed his research (1967). With the knowledge available today, the notion that Cochise/Mogollon populations moved into the West Mesa area is less credible than it may once have been, for we know now that the area sustained a resident Archaic population for at least 4500 years.

The Rio Rancho phase occupation of the West Mesa was characterized by large, elliptical structures with hearths and possible storage pits. Significantly, the cooking pits were located outside of the structures (Reinhardt 1967a:220-221), suggesting a warm season occupation. Large amounts of fire-cracked rock are present (Reinhardt 1967c:459). Sites are located on the south sides of sand dunes near the heads of small arroyos. One cave site, Boca Negra Cave, located along the north edge of one of the volcanoes, was occupied intermittently over a long temporal span.

Reinhardt (1967a:211-212) suggests that Rio Rancho phase populations practiced incipient horticulture. Hunting, though, was the main emphasis of the populations using the West Mesa. However, Bice's

(1968) excavations at an early Basketmaker site in this area led him to suggest a diet consisting of seeds, fruits, hearts, and succulent portions of grasses, yucca, cactus, and scrub bushes which are found in the area.

During the succeeding Alameda phase, the total number of occupational loci decreased, and a major subsistence change occurred. Compared with the preceding phase, there is abundant evidence for gathering and horticulture, and correspondingly little for hunting. The only faunal remains are those of rabbits and other small rodents. Toward the end of the period maize appears in open sites. A new race of maize, Maiz de Ocho, makes its appearance in the Rio Grande Valley during the Alameda phase. This new race supplemented Chapalote, and the crossing of the two produced the Pima-Papago hybrid variety (Reinhardt 1967a:212).

All identifiable Alameda phase sites are located on dune-covered ridges overlooking present-day arroyos. The site closest to the Rio Grande is located eight miles from it. In all, this represents a continuity of settlement pattern from earlier time periods (Reinhardt 1967b:24).

The Alameda phase does differ from the Rio Rancho phase in a number of aspects besides subsistence. Alameda phase structures are shallow pithouses with cooking and storage pits outside, and a single interior hearth (Reinhardt 1967a:221). The presence of the interior hearth suggests at least some cool season occupation (but not necessarily winter). One site contained two such pithouses (Reinhardt 1967b:24). The bow and arrow, as well as a crude grey pottery, were introduced during this phase, and trough metates were employed. Reinhardt (1967a:234) suggests that the latter two were copied from southern forms.

In all, the Rio Rancho and Alameda phases show little change through time in settlement pattern and in social organization. The number of people in residence groups did not vary, having stabilized at perhaps 8-12 members (Reinhardt 1967a:227-229). The consistent placement of sites on the south faces of dunes would have provided solar exposure and protection from the north wind. Situating sites near dunes and water courses suggests maize horticulture (Reinhardt 1967a:224).

Palynological data suggest that, at the end of the Alameda phase, a drought occurred. Reinhardt (1967a:213-214) believes that this event forced relocation of settlements to the Rio Puerco and Rio Grande where dependable water was available. After this time, human use of the northern West Mesa was intermittent (Reinhardt 1967a:193). It would appear that the area to the south of the Rio Rancho development apparently did not sustain the kind of intensive occupation just discussed (Reinhardt 1967a:202; Johnson 1976). Portions of this latter area were, however, used for agricultural purposes during later Pueblo periods (Rodgers 1978).

Following the abandonment of the Rio Rancho area, Basketmaker III populations occupied the eastern escarpment of the West Mesa overlooking the Corrales valley, where they settled near washes having gentle gradients down to the Rio Grande. These locations were suitable for floodplain agriculture (Frisbie 1967; Allan 1975). In subsequent time periods, populations moved further down into the Rio Grande floodplain (Frisbie 1967:143). Pithouse villages were established at many locations between the West Mesa and the Rio Grande (Peckham 1957; Skinner 1965; Vivian and Clendenan 1965).

The occurrence of the Rio Rancho and Alameda phase archeological materials on the West Mesa presents an intriguing situation. The West Mesa is an area where surface water is a scarce resource, far scarcer than in the surrounding river valleys. In terms of edible foods, the lower degree of topographic diversity which characterizes the West Mesa, compared with the river valleys, indicates a less diverse resource base. These observations, coupled with the fact that the West Mesa was intensively occupied rather late in the Archaic sequence, indicates that the area is definitely marginal for a population based on hunting and gathering or horticultural. Indeed, Bandelier went so far as to describe the West Mesa as "waterless, bleak, and bare" (1892b:309). Given this, it is surprising to find a considerable population of pithouse-building horticulturalists occupying the area in the late Archaic.

While this population may not have remained in the area year-round (the lack of water argues against this), nevertheless the energy investment in constructing pithouses

indicates a substantial occupation approaching sedentary residence. The obvious question is, why were such substantial settlements occupied in this marginal environment? The answer probably lies in the pattern of continual population growth which Irwin-Williams (1973) has documented throughout the Archaic period in the adjacent Arroyo Cuervo. It would appear that, by some point in the late Archaic, population in the area had reached such a level that local resources in the river valleys were not sufficient, and it was necessary for populations to establish substantial settlements in marginal resource zones.

It is highly significant that this resettlement in marginal zones follows closely in time upon the inception of horticulture, population aggregation, expansion of the settlement system, and increases in social and ritual complexity in the Arroyo Cuervo area. All of these represent changes requiring greater energy expenditure in subsistence pursuits and in social organization. All can be argued to be responses to the stress of an expanding population. If this argument is valid, it suggests that by the late Archaic, this portion of New Mexico was experiencing a population distribution which approached the saturation level for the subsistence adaptation employed. Certainly the intensive utilization of the West Mesa indicates that resources were being sought in areas which had heretofore been underutilized. The existence of this type of stress in the late Archaic makes the development of sedentary, agricultural adaptations in the Basketmaker III period eminently understandable without resorting to diffusionary explanations.

This pattern of population growth not only led to the late Archaic occupation of the West Mesa, but may have continued throughout that occupation. Reinhardt (1967a) noted that during the earlier Rio Rancho phase, populations using the West Mesa did so primarily for the purpose of hunting. During the subsequent Alameda phase, use of the area shifted from hunting to gathering and horticulture. This change represents a clear shift to utilization of a lower trophic level in the food chain. Such a change would be expectable under conditions of population pressure.

Anasazi

Anasazi occupation of the eastern subarea

has not been as well studied as the Archaic. Ongoing research under the direction of Cynthia Irwin-Williams of Eastern New Mexico University is beginning to address the Anasazi occupation of the Rio Puerco in greater detail, and increased knowledge will soon be available.

Sky Village Phase (600-700 A.D.)/ Loma Alta Phase (700-850 A.D.)

The phases correspond to the late Basketmaker III/Pueblo I phases in the general Anasazi sequence. They represent the transition from a mixed foraging/horticulture, transhumant pattern to one of more complete sedentism. The late En Medio and Trujillo phases represent, Irwin-Williams suggests (1973:15), the maximum limits of a seasonal hunting and gathering strategy. With continual population pressure, a shift to more sedentary existence, reliant on agriculture, was the normal consequence. Anticipating this subsistence switch, a few Trujillo phase settlements were located in the wider valley bottoms (C) which were suitable for agriculture. This location is outside the normal En Medio-Trujillo land use pattern. But Irwin-Williams suggests (1973:15) that the immediate cause of the collapse of the mixed foraging/horticultural strategy was a brief but extreme dry period between 600 and 700 A.D. This drought initiated a disastrous episode of erosion. All major canyons were affected, and the narrow canyon flood plains, which were the basis for late Archaic agriculture, were largely destroyed.

The response to this was to shift to areas where agriculture could be practiced, even at the expense of hunting and gathering. All cliff-base shelters were abandoned, as were most dune ridges. The new land use pattern strongly focused on the wider valley bottoms (C) which were less affected by erosion. These sites contain from one to fifteen surface structures or pithouses. There were many technological continuities from earlier time periods (Irwin-Williams 1973:15-16).

Anasazi Settlement Patterns

There are two major areas of Anasazi settlement along the portion of the Rio Puerco investigated by Cynthia Irwin-Williams. One cluster is situated along southern

Salado Creek and from there northward along the Rio Puerco to the juncture of Hay Meadow Canyon. The larger cluster is situated to the north, between the towns of Casa Salazar and Guadalupe (Pippin 1979:3). Prehistoric settlement concentrated in both areas because of the presence of aquifers (Irwin-Williams, personal communication). Populations shifted to these areas, from the Arroyo Cuervo, during the Sky Village/Loma Alta phases, concomitant with the shift to major dependence on agriculture. This represents a shift out of the area of maximum diversity of wild plants to areas of greater agricultural potential (Irwin-Williams, personal communication).

Anasazi settlement patterns in the Salado Canyon area have been studied by Fritz (1973). Pueblo sites were found to be located in three general areas: in portions of the floodplain not suitable for farming, at mesa edges and on mesa remnants, and at mesa bases on colluvial slopes.

Rainfall fluctuations were a major problem to be coped with by Anasazi farmers. A shift to summer dominant rainfall around 900 A.D. precipitated a period of arroyo formation. As a result, floodwater or irrigation farming was no longer feasible, and populations had to switch to dry land agriculture. By the tenth to eleventh centuries floodplain channels were 10 to 30 feet deep.

Fritz (1973:51-52) defines seven ceramic periods in the Salado area. These are shown in Table 5. Fritz's study excludes the last two ceramic periods.

Few sites have been found in Ceramic Period 1, and it may not have been a permanent occupation. But for Period 2 a total of 55 sites have been found, leading to the suggestion that there was a movement into the area from the Puerco Valley. The Salado was densely occupied by A.D. 975, except for the eastern end of the canyon which has the poorest agricultural potential. However, even this eastern section held a large number of sites by the end of Period 3. During this period there were also increases in the western end of the canyon. (The settlement of the eastern end of the Salado during Period 3 is arguably a good example of the occupation of marginal resource zones in response to population growth.)

Ceramic Period 3 represents the plateau of population in Salado Canyon. The number of sites remains steady through Period 4 and into the 1300s, after which the area became rapidly depopulated. Climatic change and arroyo cutting may have made the area unsuitable for farming. By the 1350s the Salado was abandoned.

In an attempt to find associations among archeologically observable attributes of the Salado sites, Fritz (1973:66-67)

Table 5
Ceramic Periods In The Salado Area*

Period	Ceramic Characteristics
1. 850-900 A.D.	Red Mesa B/w
2. 901-975 A.D.	Escavada B/w, Red Mesa B/w
3. 976-1200 A.D.	Gallup B/w, Puerco B/w, McElmo B/w (Chaco variety), Mesa Verde B/w, Chaco B/w, Puerco B/r, Wingate B/r, Socorro B/w, Kwahe'e B/w, Houck and St. Johns polychromes
4. 1201-1300 A.D.	Santa Fe B/w, Gallinas B/w
5. 1301-1350 A.D.	Galisteo B/w, Wiyo B/w; end of Santa Fe B/w
6. 1351-1400 A.D.	Decline of Wiyo B/w; no new types; limited use of area
7. 1401-1657 A.D.	Jemez pottery; non-occupational period; Navajo intrusions

*after Fritz (1973:51-52)

performed a cluster analysis using the following attributes: 1) number of rooms, 2) site area, 3) maximum length of site, 4) maximum width of site, 5) area of smallest room, 6) area of largest room, 7) building material, 8) topographic location, 9) shape, 10) ceramic period, and 11) pottery types. Because these data are mixed-mode (that is, have both discrete and continuous variables), Fritz defined each of the attribute states of these variables as a separate variable. For example, the variable "number of rooms" was divided into five separate variables: 1) 0-3, 2) 4-10, 3) 11-17, 4) 18-20, and 5) unknown. This gave a total of 71 variables in the analysis. Fritz then computed Jaccard Coefficients between all combinations of these. (The Jaccard Coefficient is a simple matching statistic for binary data which excludes negative matches from consideration.) The Jaccard Coefficients were then used as the basis for the average linkage cluster analysis.

Although this is an interesting and commendable attempt to find statistical clusters, the results are marred by improper statistical techniques. Fritz's variables are overwhelmingly autoassociated. That is, they are mutually exclusive by design, as can be clearly seen in the case of "number of rooms," above. Of the 71 attributes, there are none which do not display some degree of autoassociation. Due to this problem, the computed Jaccard coefficients are not valid, and so the resulting cluster analysis is meaningless. It is no surprise, then, that Fritz (1973:67) could find no patterning to the clusters derived.

In the Guadalupe area, to the north of the Salado, Washburn (1972, 1974) analyzed change in Anasazi settlement patterns through the use of nearest-neighbor analysis. Pueblo settlements in this area are quite restricted in their distribution. They are found around mesas, mesa outliers, and eroded Pleistocene terraces. They are not located on the colluvial wash areas at the base of these features (Washburn 1974: 316). Since the sites Washburn dealt with are, therefore, obviously clustered, interpretations of individual nearest neighbor values would be trivial. The only valid approach would be to study change in nearest neighbor values through time, as Washburn does.

To achieve temporal control over her data,

Washburn (1974:322) focuses on individual, major pottery types, and makes the assumption that each of these represents a distinct time period. The exception to this is the Pueblo I period, for which she employed all relevant pottery types. The remaining pottery types are, in sequence, Red Mesa B/w, Gallup B/w, McElmo B/w, Kwahe'e B/w, Santa Fe B/w, and Socorro B/w. The use of individual ceramic types to diagnostically indicate individual time periods is undoubtedly an oversimplification. Burns (1978) has developed a more sensitive ceramic chronology for the area. This chronology is reproduced in Table 6. A comparison between this table and Washburn's ceramic periods will reveal the oversimplification of the latter.

The nearest neighbor statistic is ordinarily computed as the ratio of the observed mean distance to nearest neighbor over the mean distance expected if points were distributed randomly. Washburn (1974: 322) chose to use the median rather than the mean in her calculations. Her reason is that, since the distribution of nearest neighbor distances was bimodal, the mean would not be an accurate reflector of the population. Unfortunately, it is not clear in this case that the median is either.

Population trends in the Guadalupe area are significant. There was an increase in the number of sites through the Gallup B/w period, then a decrease. During the Pueblo I and Red Mesa B/w periods there was a slight tendency in the distribution of sites away from clustering. This was followed by a shift back toward clustering as a response to deteriorating climatic conditions. This tendency toward aggregation lagged somewhat behind the population peak in the area.

In general, Washburn's results suggested that during arid periods, sites showed a tendency toward clustering, while under moist conditions settlements were more dispersed. The McElmo B/w period, however, was out of phase with this pattern, and indeed displayed a distinctive locational strategy. The tendency toward aggregation during arid intervals is understandable, for under such stress, responses like sharing, cooperation, intergroup movement, and the like, have positive advantages.

One final problem in Washburn's study is that her analysis does not consider vertical distance between sites. Since some

Table 6.

TEMPORAL DIVISIONS OF ANASAZI PERIODS IN THE MIDDLE PUERCO VALLEY*

Period/Complex		Diagnostic Pottery
Early Chaco A	500-600	Predominantly La Plata B/w; Lino Gray
Chaco A	600-750	Predominantly White Mound B/w; Lino Gray
Late Chaco A	750-875	Polished White Mound B/w; San Marcial B/w; Lino Gray; Early Neckbanded?
Chaco B	875-925	Red Mesa I B/w; Kiatuthlana B/w; Lino Gray; Neckbanded
B/C Transition	925-1000+	Red Mesa II; Neckbanded; Early Corrugated Varieties
Early Chaco C	1000-1050	Red Mesa II; Early Corrugated
Chaco C	1050-1075	Predominantly Gallup B/w; corrugated
Late Chaco C	1075-1125	Gallup B/w; Early Chaco McElmo B/w: Intrusive Carbons (Tusayan etc.)
Early Chaco D	1125-1175	Predominantly Kwahe'e B/w; Puerco variant; or/Late Chaco McElmo B/w.
Late Chaco D	1175-1250+	+/- Above varieties; predominantly Santa Fe B/w; Socorro B/w
Loma Fria	1175-1260+	Loma Fria B/w varieties (Sundt's Chaco McElmo); Guadalupe B/w
Mesa Verde	1260-1300+	Mesa Verde B/w; Puerco variety; Late St. Johns Polychrome.

*after Burns (1978:22)

sites were located on mesa tops, this may have been a significant factor.

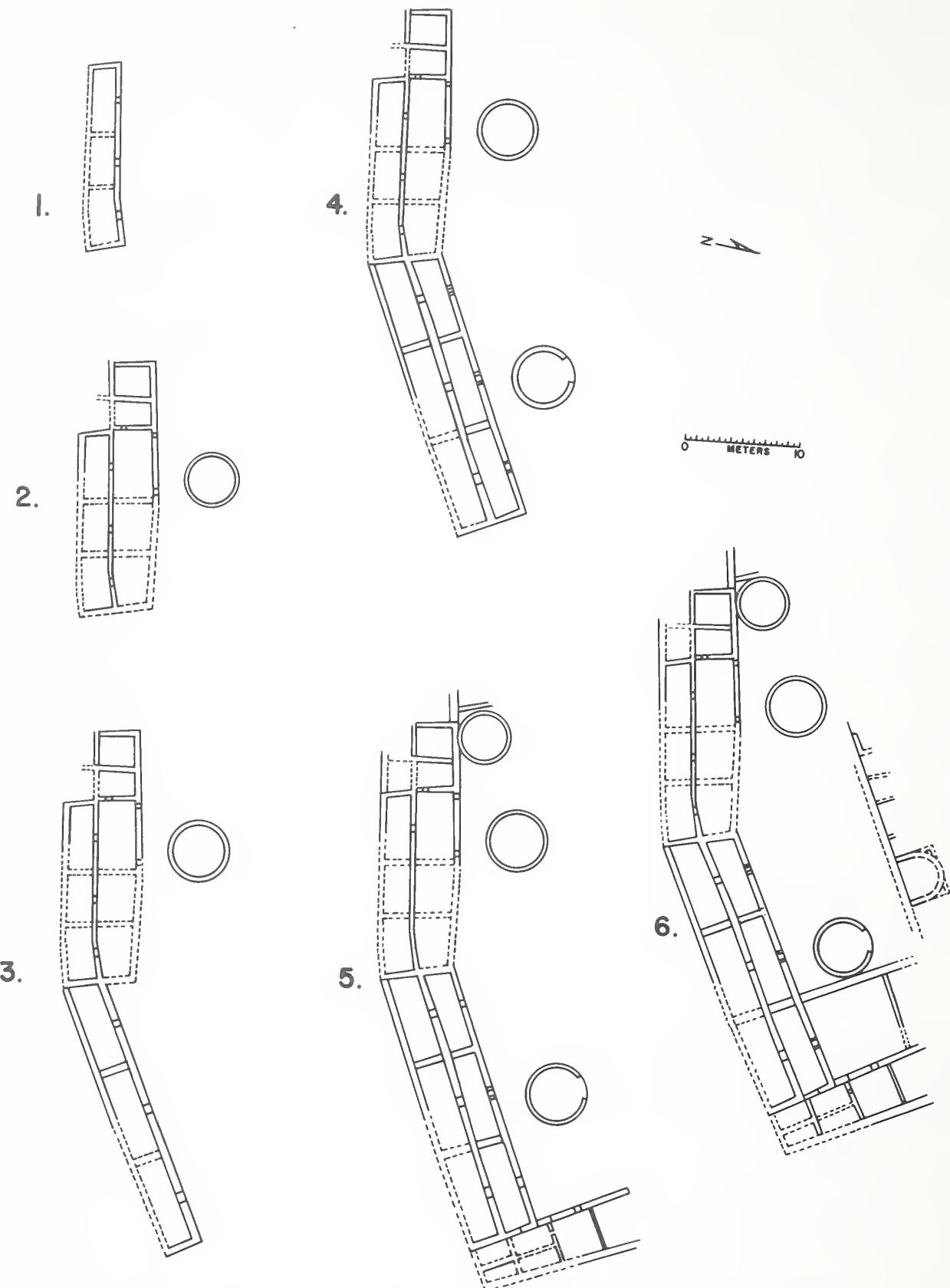
Guadalupe Ruin

One excavated site in the area covered by Washburn's study which deserves special discussion is Guadalupe Ruin. This site is particularly important because it is the only Chacoan "outlier" in the overview area which has been excavated according to modern standards, and adequately reported (Pippin 1979). The Chacoan outlier phenomenon will be discussed in more detail in a later section of this work.

Guadalupe Ruin underwent a number of constructional episodes (Terrel 1979). These are shown in Map 12. Pippin (1979) has investigated the nature of this construc-

tional sequence. The initial construction, termed the Early Chaco occupation, was characterized by a masonry style which Pippin (1979:173) terms Single Wythe, Unfaced, Coursed Rubble Walls. It is similar to Judd's "Style 1" at Pueblo Bonito, and to Hawley's "unfaced Slab" and "Spalled Blocks Without Core." In Chaco Canyon these varieties date between 861 and 950 A.D. There are no kivas definitely associated with this construction.

The Late Chaco occupation is associated with the second, third, and fourth additions. Masonry styles associated with this occupation are called by Pippin (1979: 180) Double Faced, Narrow Banded, Coursed Rubble and Double Faced, Wide Banded, Coursed Rubble. This occupation is difficult to date. The wall abutments show that the narrow banded walls predate the wide



Map 12. Architectural Development Of Guadalupe Ruin (after Terrel 1979). Reproduced by permission of Cynthia Irwin-Williams.

banded ones. The narrow banded variety is similar to Hawley's "Narrow Banded with Core" or "Spalled Blocks with Core." In Chaco Canyon the former dates to between 1030 and 1070 A.D. and the latter between 1050 and 1125. At Guadalupe the narrow banded variety probably dates 1050-1125. Two kivas, without pilasters, were built during the fourth constructional episode.

What is called the Secondary Occupation added small rooms and large kivas with masonry pilasters during the late 1200s (constructional episode 5). It is not known when the row of rooms on the south side was added. There were no glazes or biscuit wares present at the site, so apparently it was abandoned by the early 1300s. The secondary occupants added some new rooms, but preferred to modify existing ones. Three kivas were in use during this time.

A commendable aspect of Pippin's (1979) study is its focus on subsistence remains. Faunal remains at the site yielded the following dietary percentages by meat weight:

Bighorn Sheep	47%
Deer	31%
Pronghorn Antelope	17%
Cottontail	2%
Jackrabbit	1%
Turkey	1%

Additional fauna included ground squirrel, prairie dog, pocket gopher, woodrat, bear, badger, bobcat, and duck. Longnose gar and flat head chub were probably traded in. There were 32 species of birds, excluding turkey.

Corn (Maiz de Ocho) and squash were the major cultigens represented by plant remains. The Chacoan occupants favored corn with fewer rows (8-12) and smaller kernels, while the secondary occupants favored corn with 12 rows and slightly larger kernels. No beans were found. A variety of edible wild plants were collected, representing species of grasses, weedy shrubs, cactus and succulents, and pinyon pine.

Pippin suggests (1979:320-321) that the earlier sites in the Rio Puerco area were similar to those in Chaco Canyon, and that the town/village dichotomy in Chaco is analogous to the sitation on the Puerco.

This, he argues, indicates parallel developments. Thus the presence of a Chacoan town in the Puerco Valley need not represent a Chacoan migration (Pippin 1979:329). Guadalupe and Lowry Pueblo in Colorado are the only Chacoan outliers known to have been established in the tenth century A.D. (Pippin 1979:319).

The Secondary Occupation began in the late 1200s, after the collapse of the Chacoan phenomenon. It was a short-lived occupation, for the site was again abandoned in the early 1300s. Sites with McElmo B/w tend to cluster south and east of Guadalupe Ruin, while sites dominated by Santa Fe B/w are more dispersed (Pippin 1979:339). This is an interesting observation, and may relate to the establishment of preferential economic ties on the part of subsets of the local population. Pippin (1979):339) suggests that the two ceramic types may be contemporaneous.

Pippin (1979:340) makes a series of observations concerning the Secondary Occupation. These are:

- 1) Guadalupe B/w is similar to McElmo B/w;
- 2) Guadalupe B/w and Mesa Verde B/w are limited in distribution to sites surrounding Guadalupe Ruin;
- 3) "San Juan" style kivas are present at the site;
- 4) Guadalupe Ruin is similar in ground plan to the San Juan area sites; and
- 5) Guadalupe B/w is dominant in the initial Secondary Occupation.

Based upon these observations, Pippin (1979:340) concludes that the secondary occupants were people with "... cultural ties with Anasazi in the San Juan River-Mesa Verde area." This is a far more conservative assessment than Davis' conclusion (1964; Davis and Winkler 1959) that such occupations represent actual movement of Mesa Verdean populations.

The Lower Puerco

After the abandonment of the upper Rio Puerco in the early 1300s, settlement continued along the lower Puerco until the early historic era. In this area the well

known site of Pottery Mound is located (Hibben 1955, 1967, 1976; Voll 1961; Brody 1964; Warner 1928a, 1928b). Pottery Mound is a predominantly Glaze I site (1300-1475 A.D.), definitely abandoned by early Glaze III times. Its initial construction was an artificial, flat-topped mound consisting of two levels. A stairway led to the first level. This mound, along with other finds, has Ted Hibben (1967, 1975) to postulate Mesoamerican influence in the locale.

The structure of the site consists of adobe room blocks surrounding four plazas. Some later buildings were placed on top of the mound. At least 17 subterranean kivas were present, many containing the well preserved murals for which the site is justly famous (Hibben 1975).

Ceramically, Pottery Mound shows strong trade relations with Acoma, Zuni, and Hopi. There was relatively little interaction with the black-on-white producing Rio Grande pueblos to the North (Brody 1964).

Pottery Mound is the only site which has been intensively investigated along the lower Rio Puerco, and it has not been adequately reported. This is a geographical area in which major research is needed, for the development of this complex, aggregated settlement is a topic urgently requiring explanation. A sample survey of the lower Puerco, recently completed for the U.S. Army Corps of Engineers (Wimberly and Eidenbach 1980), has produced some welcome data. This survey documented occupation from at least the Basketmaker III period.

THE SOUTH-CENTRAL SUBAREA

The Acoma Area

The south-central subarea corresponds largely, but not exclusively, to the area which Ruppé (1953) has termed the Acoma Culture Province. Thus the synthesis in the following pages details the known prehistory of Acoma and Laguna pueblos.

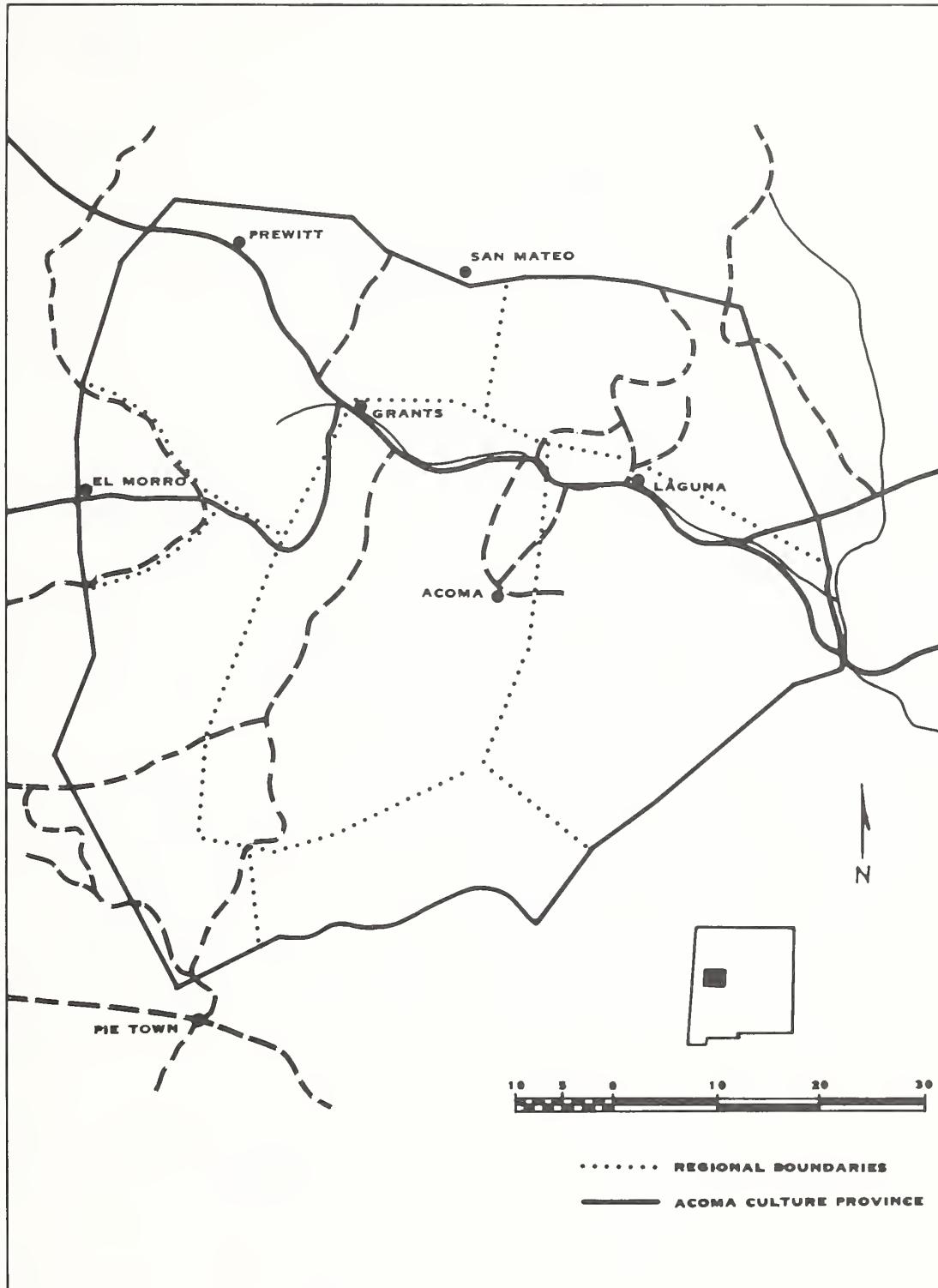
Modern research in the area was initiated by Alfred Dittert (1959, 1959) and Reynold Ruppé (1953, 1966; Dittert and Ruppé 1951, 1952; Ruppé and Dittert 1952, 1953). Subsequent work, at least in the area to the southwest of Acoma Pueblo, has been oriented around their pioneering studies.

The concept of the Acoma Culture Province was proposed by Ruppé (1953) to define an area of broad archeological similarities with a pattern of cultural evolution leading to the establishment of Acoma Pueblo. The boundaries of the area, shown in Map 13, are delineated on the basis of geographical points held sacred by the Acomas and used as shrines. These sacred points agree well with the distribution of Acoma Culture Province archeological materials (Ruppé 1953:319), and so the status of the area as a distinct socio-ethnic entity may be projected back considerably in time.

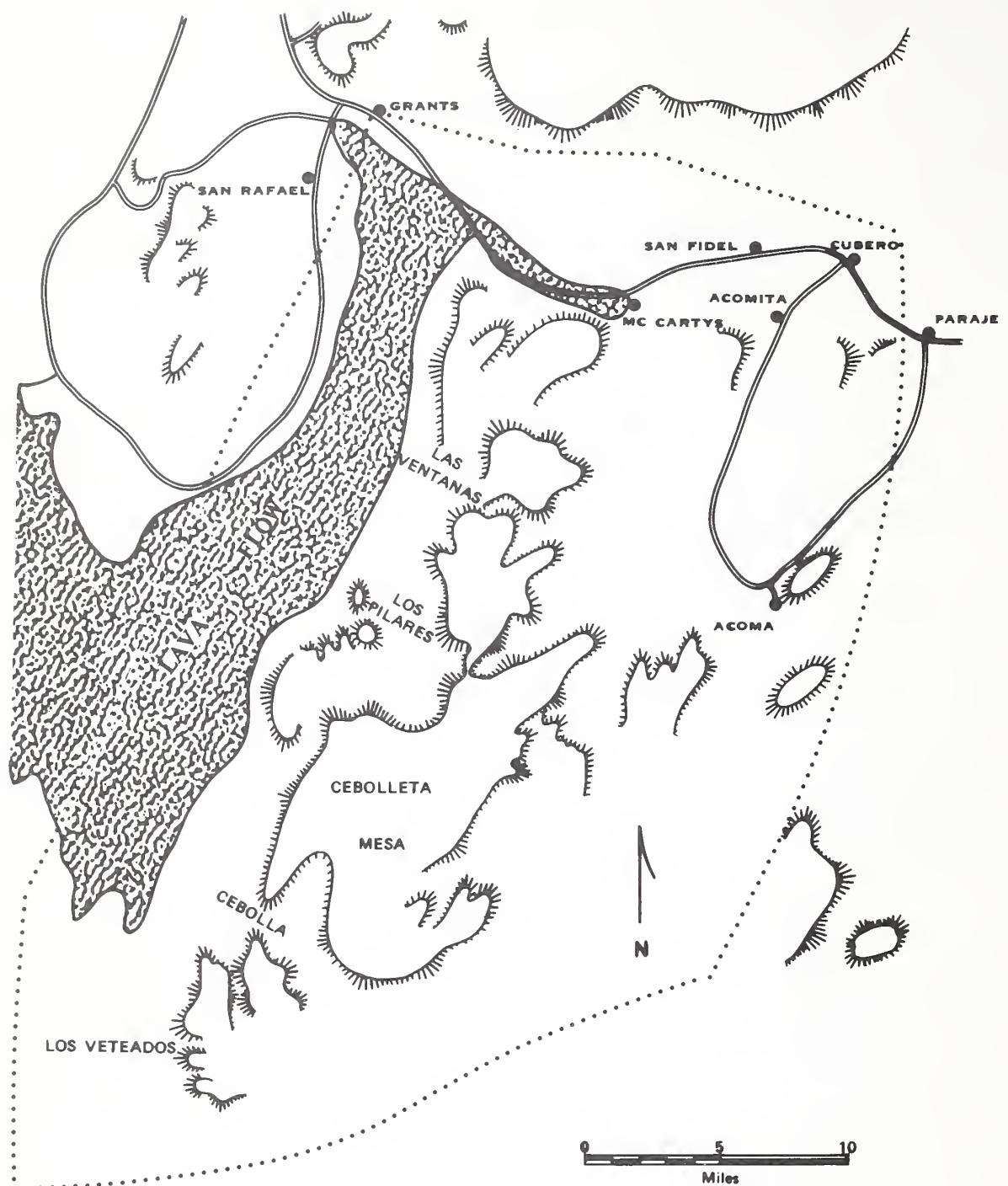
Dittert (1959) tentatively divides this large geographical area into six subregions (Map 13), the centermost of which is the Cebolleta Mesa region (Map 14). It is in this area that Ruppé and Dittert concentrated their fieldwork. Unfortunately, the defining characteristics of the six subareas of the Acoma Culture Province have not been specified.

Ruppé (1953) and Dittert (1959) concentrated their research on the topic of delineating the Anasazi/Mogollon boundary, following Reed's (1946) suggestion that it runs through this area. In several seasons of fieldwork around Cebolleta Mesa, a cultural/temporal sequence was established, first by Dittert (1949), later expanded by Ruppé (1953), and revised by Dittert (1959). Since Ruppé (1966:319) has now accepted Dittert's sequence, it will be the one followed here.

The early part of Dittert's sequence is sketchy. He relied on Bryan and Toulouse's (1943) characterization of Archaic occupation in the Grants area, which at the time was the only comparable material available. Following Bryan and Toulouse, both Ruppé and Dittert see two Archaic phases in the area, an earlier San Jose and a later Lobo period. Projected dates covering both periods were given as 2500 B.C.-700 A.D. (Dittert 1959:37). Based upon her work in the Arroyo Cuervo region, Cynthia Irwin-Williams (1973) dates the San Jose phase between 3000 and 1800 B.C., while suggesting that the Lobo materials are similar to the succeeding Armijo phase (1800-800 B.C.). The termination of the Lobo complex in the Cebolleta Mesa region is a matter of some ambiguity, for Lobo materials can be found well into the early Pueblo period (Ruppé 1953; Dittert 1959). This matter will be returned to shortly.



Map 13. The Acoma Culture Province (after Dittert 1959:11). Reproduced by permission of the author and the Department of Anthropology, University of Arizona.



Map 14. The Cebolleta Mesa Region (after Dittert 1959:79). Reproduced by permission of the author and the Department of Anthropology, University of Arizona.

Dittert's (1959:37) cultural/temporal sequence spans the period from 3000 B.C. to the present. For the San Jose and Lobo periods I have revised Dittert's dates to correspond to the Arroyo Cuervo sequence. Otherwise, Dittert's sequence is shown in Table 7.

The White Mound through Red Mesa phases follow Gladwin's (1945) formulation for the Chaco Branch. By 950 A.D., however, the region displays such archeological distinctiveness (Dittert 1959:543-544) that the designation of the Acoma Culture Province thereafter becomes appropriate (Ruppé 1953:70).

Topographic Correlates Of Settlement Distribution

There are nine topographic situations in the area in which settlements have been found (Dittert 1959:56-58):

- 1) Sites are located on the first rise above the floor of the North Plains, or in an elevated location at the mouth of a major drainage. Such sites are often situated at a point just beyond the pinyon-juniper zone. Larger tracts of arable land are nearby.
- 2) In the Los Pilares district (see Map 14) sites are found on the high ground above flood-prone areas. Such sites are located on slight rises at the edge of basalt flows, or on the flows.
- 3) In main canyons, about a mile upstream from the mouth, sites are located on benches above the canyon floor. The major canyons show a tendency to constrict in these areas.

4) Upstream from location 3, sites are found on benches above the canyon floors. In the lower portions of canyons sites occur on benches in small side rincons.

5) In both tributary valleys and in portions of the main canyons which are bounded by cliffs, small shelters were constructed against the bluffs.

6) A few settlements were located in high timbered areas away from arable land.

7) Sites are found on flat-topped mesas (like Acoma Pueblo).

8) In the Los Pilares locality, along the southwest-facing slopes of Putney Mesa, sites are found. They are specifically located below the talus slopes on benches that have small water catchment basins and correspondingly lush vegetation. Dittert (1959:58) terms such locations "mountain meadows." Each has one or more sites.

9) Sites are located in sand hills.

Archaic/Basketmaker

The Archaic occupation of the Cebolleta Mesa region is largely unknown. Those sites which are known have been found in overhanging shelters, in sand dunes, on mesa tops, along the southwestern-facing slopes of Putney Mesa, and on the upper bench along the east edge of the North Plains (Dittert 1959:518). Grinding implements are abundant, suggesting seasonal gathering activities (Beal 1976c:15). Dittert (1959: 521) suggests that the Atrisco and Santa Ana complexes of the Rio Grande/Jemez River areas form the eastern boundary of the San Jose-Lobo

Table 7
Cultural/Temporal Sequence of the Cebolleta Mesa Region*

Local Phase	Date	Pecos Classification
Acoma	1600 - present	Pueblo V
Cubero	1400 - 1600 A.D.	Late Pueblo IV
Kowina	1200 - 1400 A.D.	Pueblo III to Pueblo IV
Pilares	1100 - 1200 A.D.	Pueblo III
Cebolleta	950 - 1100 A.D.	Pueblo II
Red Mesa	870 - 950 A.D.	Early Pueblo II
Kiatuthlanna	800 - 870 A.D.	Pueblo I
White Mound	700 - 800 A.D.	Basketmaker III
Lobo	1800 B.C. - 700 A.D.(?)	
San Jose	3000 - 1800 B.C.	

*after Dittert (1959:37), with modifications.

manifestations, a distribution which anticipates the later boundary of the Acoma Culture Province.

In the Los Pilares district, centered toward the northern end of Cebolleta Mesa, Ruppé (1953:99) noted that Archaic artifacts were found associated with pottery diagnostic of the Pueblo I period. Ruppé (1953:100) postulates that in this area, the Pueblo I stone tool industry derives at least in part from the Lobo complex. He suggests that this phenomenon ". . . may reflect the civilizing of a local nomadic hunting population by a sedentary farming people newly arrived from the north or west" (1953:102).

The possibility of coexistence in the same area by populations following different subsistence strategies is fascinating. Such a phenomenon is common ethnographically (e.g., Williams 1974). Yet it is a possibility which is not anticipated by, and indeed conflicts with, the normative, rigidly evolutionary framework of the Pecos Classification. Within the normative framework, cultural changes are expected to diffuse rapidly. The existence of hunters and gatherers rejecting the supposed advantages of agriculture is the kind of anomaly which normative thinking cannot accommodate (cf. Cordell and Plog 1979). Indeed, this is precisely the kind of anomaly which Kuhn (1962) suggests will precipitate the questioning of an accepted paradigm.

Ruppé (1953:102) believes that the Basketmaker (White Mound phase) occupation of the area is late, being transitional to the Pueblo I period. Given the lack of earlier Basketmaker occupation, Ruppé suggests that this indicates entry into the area by populations from the north or west who brought a late Basketmaker adaptation with them.

This interpretation should be viewed with caution. It relies on too rigid adherence to the evolutionary aspects of the Pecos Classification. The notion that *in situ* cultural evolution must pass through a specified series of stages was rejected in anthropology (even by evolutionists) many years ago. The lack of early Basketmaker manifestations in the Cebolleta Mesa region is not by itself grounds for postulating that the White Mound phase represents a settlement intrusion.

White Mound Phase (700-800 A.D.)

White Mound phase sites are found in all topographic situations, but primarily on low benches that border drainages in the upper ends of canyons, on the southwest-facing slopes of Putney Mesa, and in higher sand hills (Dittert 1959:523). Sites were preferentially located along the northern half of Cebolleta Mesa (Ruppé 1953:103).

The ceramic characteristics of this phase are shown in Table 8. Architecturally, the period was characterized by pithouses accompanied by small surface structures, with shelters built against low cliffs (Dittert 1959:525).

Kiatuthlanna Phase (800-870 A.D.)

Pueblo I sites are located on secondary benches, mesa tops, and prevailingly on sandy slopes of tributary drainages, well back from the mouths of these (Ruppé 1953: 107). Some shelters were built against low cliffs in these tributaries (Dittert 1959: 526).

Pithouses were the dominant architectural form, particularly early. Later, jacal surface structures came to be used more frequently, with contiguous structures built in a crescentic plan. Coursed masonry sandstone was used as a base, and may have occasionally been the only wall material (Ruppé 1953:197, 332; Dittert 1959:526).

Kiatuthlanna B/w is the dominant pottery type. Early Pueblo I period sites usually have no brownwares, but by the later portion of the phase up to 5 or 6 percent of the ceramic assemblage on northern sites may be brownwares, while in the south this may range up to 17 percent. Ruppé sees this as evidence for Mogollon intrusion. Other than ceramic percentages, there are no major differences between the northern (Los Pilares) and southern (Los Veteados) districts during this period (Ruppé 1953: 107, 109, 326-327).

Red Mesa Phase (870-950 A.D.)

During the Red Mesa phase, the higher topographic divisions experienced decreased use, with a concentration of sites just

Table 8

Ceramic Characteristics Of Temporal Divisions In The Acoma Area*

Phase	Ceramics
White Mound	White Mound B/w, Lino Grey. Intrusives: Alma Plain, Alma Neck Banded, redwares.
Kiatuthlanna	Kiatuthlanna B/w, Kana-a Grey. Intrusives: San Juan Redware, Alma Plain, Alma Neck Banded.
Red Mesa	Red Mesa B/w, Socorro B/w, Kana-a Grey, Exuberant Corrugated. Intrusives: Wingate B/r, Alma Scored, San Francisco Red, Forestdale Smudged, plain brown ware. Pilares Brown near end of period.
Cebolleta	Cebolleta B/w, Socorro B/w, Kana-a Grey, Exuberant Corrugated, Tohatchi Banded, Northern Grey Corrugated, Pilares Banded. Intrusives: Gallup, Escavada, Puerco Varieties of Puerco B/w, Reserve B/w, Kwahe'e B/w, Wingate B/r, Puerco B/r, Forestdale Smudged, Starkweather Smudged Decorated.
Pilares	Cebolleta B/w, Tularosa B/w (Acoma variety), Tularosa B/w (Tularosa variety), Socorro B/w, St. Johns Polychrome, Pilares Banded, Pilares Fine Banded, Los Lunas Smudged. Intrusives: Puerco B/w, Snowflake B/w, possibly Tularosa B/w (Tularosa variety) and St. Johns Polychrome.
Kowina	Acoma & Tularosa varieties of Tularosa B/w, Kowina B/w, Kowina Indented, St. Johns Polychrome, St. Johns Polychrome with glaze paint, North Plains B/r, North Plains Polychrome, Kowina B/r & Polychrome, Pinnawa & Wallace Polychromes, Pilares Fine Banded, Los Lunas Smudged. Intrusives: Early Klageto B/w, Springerville Polychrome, Pine-dale B/r & Polychrome, Klageto B/y & Polychrome, Heshotauthla Polychrome, Fourmile Polychrome, Pinnawa R/w, Reserve Plain Corrugated, Houck Polychrome, Querino Polychrome, Mesa Verde B/w, Reserve Indented Corrugated, Tularosa Patterned Corrugated.
Cubero	Pinnawa Glaze-on-white, Kwakina Glaze-Polychrome, Pinnawa Glaze-Polychrome, Acoma Glazes, Northern Grey Corrugated, Kowina Indented, indented brownwares. Intrusives: Matsaki Polychrome, early Rio Grande Glazes.
Acoma	Hawikuh Glaze-on-red, Hawikuh Glaze-Polychrome, Ashiwi Polychrome, modern Acoma Polychromes. Intrusives: Ashiwi & Zuni Polychromes, Tewa Polychrome, Laguna types, Dinetah Utility (rare).

*after Dittert (1959).

above the points where the main canyons constrict. The typical situation is a low knoll or low bench at the side of a canyon. But there were more sites below the canyon constrictions than in the Kiatuthlanna phase. Small units continued to be built against low cliffs in small, tributary canyons (Dittert 1959:534).

Dwellings were built of jacal walls with sandstone slab facings, or of other temporary materials. Later in the period full height walls of masonry blocks were built. Village form ranged from straight rows of rooms, sometimes two tiers deep, to L-shaped, to crescentic (Dittert 1959:534). Ruppé (1953:117) sees the maintenance of these diverse building forms as reflecting three different groups of people: indigenous Lobo complex populations, immigrant Mogollons, and immigrant northerners.

Beal (1976c) observes a dichotomy between jacal units, with 1 to 15 rooms, and masonry structures, with more than 15 rooms per room block. The jacal structures produce higher percentages of eastern ceramics (Socorro), with secondary proportions of northwestern (Red Mesa, Gallup) and southern (Brownwares) pottery. In contrast, southwestern ceramics (Cebolleta, Tularosa, St. John's, Wingate) predominate around masonry structures. Beal suggests (1976c:16) that these patterns reflect sociocultural distinctions, but acceptance of this interpretation would require accepting migration as the source of one or both of these populations. The differences in site size imply at least some differences in social organization. It is most likely no coincidence that the populations in the larger settlements, with the (probably) more complex social organization, also invested greater labor in residential construction, for all these factors are systemically linked in a labor intensive strategy of community organization. The differential distribution of ceramics may reflect the maintenance of preferential economic ties on the part of these segments of the population.

Cebolleta Phase (950-1100 A.D.)

In the Cebolleta Mesa region there was a smooth transition in the ceramic tradition from Red Mesa B/w to Cebolleta B/w. During the course of this transition a split occurred from the more widespread Chacoan

horizon. Thereafter, Cebolleta Mesa followed a different course of cultural change, and is distinguishable as an archeological entity, the center of the Acoma Culture Province (Ruppé 1953:113).

During the Cebolleta phase, the "mountain meadows" experienced an increase in the number of sites, while flat-topped mesas exhibit a slight decline. There was a marked increase in the number of sites just above the mouths of canyons (Dittert 1959:540).

Architecturally, many sites of this phase contain blocks of contiguous rooms with a consistent north-south alignment. Plazas and kivas are generally located on the east side. Crescentic-shaped rows of rooms were arranged so that the concave side, containing pithouses or kivas, faces northwest, north, or east. Jacal structures may be present within a group of contiguous masonry rooms (Dittert 1959:541).

Ruppé (1953:120-126; 166:327) believes that the Cebolleta phase witnessed considerable Mogollon intrusion. The proportion of brownwares increased, particularly in the southern portion of the area (Los Veteados district). In the northern (Los Pilares) district, 29 percent of Cebolleta phase sites display brownwares. These also have other trade wares from the north and west. In the southern district the majority of the trade wares are from the south and west. Only one southern site lacks brownwares. The remainder display up to 50 percent southern ceramics, but about half the sites range between 5 and 10 percent.

If an intrusive population were responsible for the distribution of brownwares, one would expect to find a small number of sites dominated by brownwares, with a larger number displaying smaller percentages. This kind of distribution may in fact characterize the Los Veteados region during the Cebolleta phase. Nonetheless, this alone is not convincing evidence for the massive Mogollon intrusion which Ruppé postulates for this time period. Such a distribution could be generated by other processes, such as preferential trading relationships, a hierarchy of trading centers, or by change in trade patterns through time. Until other kinds of evidence are sought (such as indicators of biological affiliation), all

of these alternatives remain equally plausible.

Pilares Phase (1100-1200 A.D.)

During the Pilares phase there was noticeably less settlement in the higher topographic divisions. In the Los Veteados district, sites have been found concentrated at the mouths of canyons or on the eastern edge of the North Plains. A smaller number of sites have been found just below the point where Los Veteados Canyon constricts. In the Los Pilares locality a large number of sites are located just below the canyon constriction, or on benches around the lower reaches of Los Pilares Canyon. These locations provide access to arable land. There was a sharp reduction in the number of sites built against low cliffs in tributary canyons, while in the last part of the period there was a settlement shift to flat-topped mesas (Dittert 1959:548).

The northern and southern districts diverge during this period in settlement characteristics. Adobe was used for construction in the south, but not in the north (Ruppé 1966:328). In the northern district, there were more sites but with fewer rooms (average 7.16 per site). In the southern area there were fewer sites, but the average of 16.76 rooms per site indicates a higher degree of aggregation.

The Pilares phase appears to have been characterized by a sharp decrease in external trade relations. The number of foreign ceramic types drops sharply, as does the number of sites with trade wares (Ruppé 1953:129). Given this pattern, the Cebolla Mesa region may be an ideal area for detailed study of the important problem of changes in trading patterns through time.

Kowina Phase (1200-1400 A.D.)

The Kowina phase was a period of major cultural change. Populations aggregated into large sites situated on flat-topped mesas, or in the Los Veteados district, in the upper wooded areas as well. All of the lower topographic divisions, and the edge of the North Plains, were utilized seasonally (Dittert 1959:553-554).

The beginning of the Kowina phase is marked by population aggregation. Large sites, up to nearly 300 rooms, were built. The largest of these is the Kowina Ruin (Forester 1962, 1963, 1964, 1965, 1966, 1970, 1976), shown here in Map 15. This process of aggregation was not unique to Cebolla Mesa. Similar processes were occurring at this time in the Zuni area (Dittert 1959:558), and to the south in the North Plains and the Mariana Mesa region (Danson 1957; Frisbie 1971, 1973).

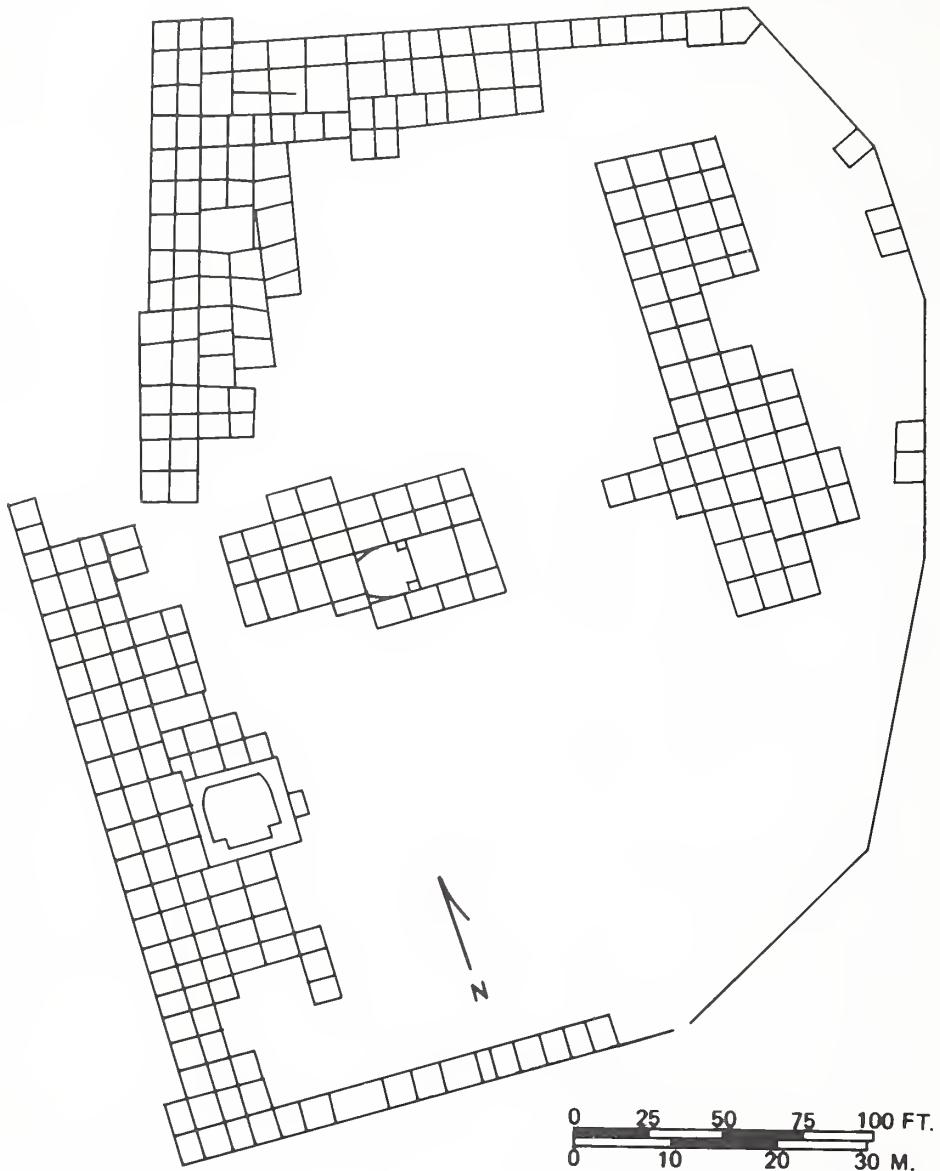
The large, aggregated sites in the Los Pilares area tend to be clusters of smaller architectural units confined within a wall or situated very close together. In the Los Veteados locality, nearly all of the large sites developed by an accretional process, building additions onto an existing room block. In the intermediate Cebolla Canyon both types appear equally. Great Kivas are present during this phase, placed either within a room block or separately (Dittert 1959:55). The Newton site, located to the south of Cebolla Mesa, may have the largest recorded Great Kiva, measuring 100.5 feet in diameter (Frisbie 1971:2).³

Dittert (1959:560) sees the Kowina phase as a period of cultural influences from the south and west. He believes that these influences came about both by population intrusion and by diffusion.

Dittert also feels (1959:561) that the movement to mesa tops was for ceremonial reasons. Ruppé, in contrast (1953:142; 1966:330), sees defense against intruders as the reason for population aggregation and settlement in defensive locations.

In a different vein, Beal (1976c:22) thinks that the settlement shift toward elevated locations near the Malpais may have been for the purpose of controlling the trade corridor along the lava beds. However, this interpretation does not account for the fact that aggregation and defensive construction was a more widespread phenomenon during this period, not at all restricted to the Malpais corridor.

Little attention has been paid to the possibility that internal competition may have precipitated the Kowina phase settlement shift. Certainly this seems to have been the case among contemporary



Map 15. The Kowina Site (after Dittert 1959:155). Reproduced by permission of the author and the Department of Anthropology, University of Arizona.

settlements in the Zuni area (LeBlanc 1978). Dittert (1959:75) has noted a major population peak in the area during the Pilares phase (see Fig. 3), a fact which suggests than an internal competition interpretation merits consideration.

In the middle of the Kowina phase even more pronounced demographic shifts took place. Except for seasonal sites, the Cebolleta Mesa region came to be abandoned at this time. Concomitantly, the area around Acoma and the Rio San Jose show sudden increases in population, presumably resulting from the abandonment of Cebolleta Mesa. Populations from the San Juan Basin, indicated by Mesa Verde B/w, may also have entered the area (Dittert 1959:563).

Cubero Phase (1400-1600 A.D.)

The major settlement during this phase was Acoma Pueblo. Small shelters were built against low cliffs along the Rio San Jose. Some small settlements have also been found overlooking confluences between the Rio San Jose and its tributaries (Dittert 1959:564).

Acoma Phase (1600-present)

Settlement during this phase continued at Acoma Pueblo, with the maintenance of agricultural centers along the Rio San Jose (Dittert 1959:568).

General Discussion

Correlating observed population trends in the Cebolleta Mesa region with inferred climatic fluctuations, Dittert (1959:71-72) has offered explanations for the population trends noticeable in Fig. 3. (This figure was constructed using Pierson's [1949] estimate of 1.9 persons per pueblo room [Dittert 1959:75].) In the early 700s, drought forced pottery-making populations to move into the San Jose Valley, and later into the central portion of the Cebolleta Mesa region. A subsequent rise in rainfall until about 800 A.D. stimulated a rapid increase in the number of occupied sites. Between 870 and 1000 A.D. rainfall remained near normal, except for a short period of possible deficiency around 950. There were considerable movements of population in the area during this time, with the region

exhibiting fewer but larger sites. The period following 1000 A.D. was drier, setting off a slow decline in population. Between 1100 and 1300 there was a pattern of increasing differentiation in site size. The larger sites grew even larger, while scattered, special-use sites of one or two rooms were maintained. Because of the Great Drought at the end of the 1200s, there were widespread demographic shifts throughout the province. Most of the population which remained moved to the San Jose drainage; others went to the Rio Grande or to the Jemez River.

Both Ruppé (1953) and Dittert (1959) see cultural change in the Cebolleta Mesa region as resulting primarily from the processes of diffusion and migration. Dittert (1959:576) has summarized this interpretation thus:

White Mound phase: site-unit intrusions;
Cebolleta phase: site-unit intrusions;
Pilares phase: trait-unit intrusions;
Kowina phase: site-unit and trait-unit intrusions;
Cubero phase: trait-unit intrusions;
Acoma phase: site-unit intrusions.

In the early period, Ruppé (1953:336) believes that most "influences" came from the north, in the form of an intrusion of late Basketmaker horticulturalists. Some populations also filtered in from the south at this time. Ruppé feels that the White Mound and Kiatuthlanna settlement patterns point to a need for defense, presumably from hunting and gathering populations in the area. Ruppé concludes (1953:340) that by the Red Mesa phase the Lobo hunters and gatherers had been either assimilated or driven out, and postulates an increase in southern influence late in this phase. In subsequent periods the northern and southern portions of Cebolleta Mesa display differences not only in ceramic assemblage, but also in architectural attributes. Orientation of structures in the south is more often east-west than in the north. Adobe was also used for construction only in the south (Ruppé 1953:342).

Viewed in this framework, Ruppé (1953:344) sees a border between the identifiably Anasazi area at the northern end of

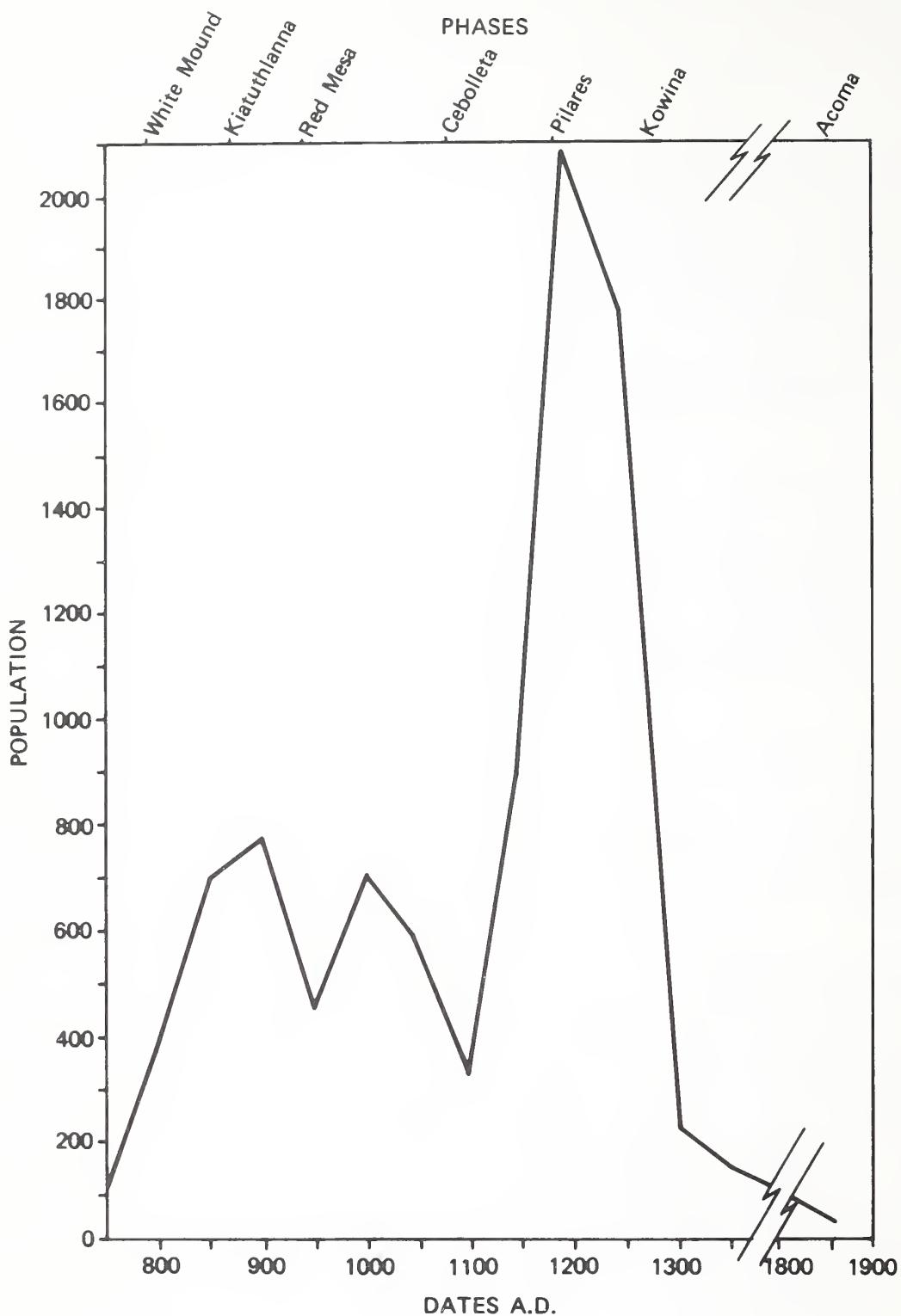


Figure 3. Population Trends In The Cebolleta Mesa Region (after Dittert 1959:75). Reproduced by permission of the author and the Department of Anthropology, University of Arizona.

Cebolleta Mesa, and a mixed area of both Anasazi and Mogollon characteristics near the southern border of the Acoma Culture Province. He suggests the need for a new cultural division for this blend area. The blend area, according to Ruppé (1953:381), will have both adobe and coursed masonry, pueblos which are oriented more often east-west than north-south, and both square and circular kivas. In short, it should contain characteristics of both the Anasazi and Mogollon areas (cf. Reed 1946).

When archeologists deal with the distribution of past cultural materials, and attempt to infer cultural boundaries from these, it is easy to lose sight of the socio-ethnic realities being described. To begin with, attempts to infer boundaries from the distribution of such things as ceramics, architecture, or site orientation, assume that such things functioned, either explicitly or implicitly, as symbols of group identity. Such assumptions, when made without supporting documentation, are tenuous. The nature of symbolism is such that the relationship between the form of a symbol and its referent is arbitrary, or at most, expedient. For the archeologist, this means that prehistoric symbols will, as often as not, contain no clue to their meaning. This problem is clearly illustrated by the difficulties archeologists face interpreting ritual artifacts. If such objects can be identified at all, it is almost always through ethnographic comparisons. Applied to the present situation, some difficulties emerge. With the exception of obvious things such as boundary markers, fortifications, and so forth, we largely do not know what kinds of material items function in horticultural societies as symbols of group identity. If Southwestern ceramics did function this way, which attributes served this purpose: overall vessel form, design style, design symmetry, or something else? Although archeologists have upon occasion been able to convincingly document prehistoric boundaries using ceramics (e.g., Woodall 1972; Houart 1975) the question of boundaries and population incursions is obviously far more complex than simple tabulations of brownware proportions.

What is more, ethnologists who have studied living ethnic groups are far less confident than many archeologists about the relationships between group identity and cultural features (cf. Barth 1969). As Barth has stated:

. . . we can assume no simple one-to-one relationship between ethnic units and cultural similarities and differences . . . some cultural features are used by the actors as signals and emblems of differences, others are ignored; and in some relationships radical differences are played down and denied (1969: 14).

Applied to the archeological record, a number of implications can be seen: 1) actual boundaries may not be symbolized by material items, 2) apparent boundaries may not really signify group differences, or 3) boundaries and groups may correspond. Ruppe, and the others who have studied the Anasazi/Mogollon boundary problem, rely on the last possibility. But on an a priori basis, this possibility has a likelihood of being correct that is no higher than .33. By extrapolation, if one cannot with confidence delineate prehistoric boundaries, then the movement of populations across these uncertain features must be equally difficult to ascertain.

It may prove profitable to view the distribution of intrusive ceramics in terms of changes in trade relations through time. Trade provides many things in addition to imported goods. It provides access to information about diverse adaptive strategies, information which may be useful to populations under stress and seeking alternative solutions to their problems. Trade which serves this purpose would be expected to increase under specific kinds of stress. Trade may also serve as an economic buffer, providing access to subsistence resources during periods of scarcity, or on the part of groups with a deficient food base. Trade of this type would also be expected to increase under certain forms of stress. But in the opposite direction, trade may decrease during periods of conflict.

Variations in the proportion of brownwares, and other imported ceramics, may well reflect changes in trade patterns through time, as well as the maintenance of trading partnerships on the part of subsets of the local population. In regard to temporal variation, the Cebolleta Mesa region shows a substantial increase in the diversity of imported ceramics during the Red Mesa and Cebolleta phases, followed by a major drop in the Pilares phase. The Kowina phase displays a return to a diverse assemblage

of imported ceramics. It is difficult to ascertain whether these fluctuations represent actual changes in external trade, or fluctuations in the diversity of ceramics made throughout the trading area. Quite possibly both processes are represented, although the drop in diversity in the Pilares phase does seem to reflect an actual decline in trading (Ruppé 1953:129). This latter phenomenon may be due to the abandonment of the San Juan Basin, or to the rising pattern of stress and competition which led to the Kowina phase. Either explanation would have interesting implications for the formation of the archeological record.

The Acoma area is an excellent region for the study of such questions. Ambiguities surrounding how the Anasazi and Mogollon entities are to be defined, whether such things as ceramic color or kiva shape can be used to define socio-ethnic groups, and the influence of trade on ceramic proportions, have implications far beyond the confines of Cebolleta Mesa. Study of these problems will contribute results of lasting value not only to the Southwest, but to archeology as a whole.

The Laguna Area

Compared with Cebolleta Mesa, archeological investigations in the Laguna area have been sporadic, primarily concentrating on individual sites or survey of restricted areas. Types of projects have included mitigation of sites threatened by highway construction (Wendorf 1954b; Sciscenti 1962a; Bussey 1966; Peckham 1967b), compilation of information for land claims cases (Ellis 1974a, 1974b), and survey of areas for mineral development (Peckham 1971a; Wilson 1971a; Kayser 1971; Beal 1976b; Carroll and Hooton 1977; Grigg, Fosberg, and Gauthier 1977, Gauthier and Lent 1977; Carroll 1979). Independent research projects have been infrequent (e.g., Sandberg 1950; Beckett 1973).

Archaic occupation in the area has been frequently documented in small survey projects (Kayser 1971; Wilson 1971b; Grigg, Fosberg, and Gauthier 1977; Gauthier and Lent 1978; Carroll 1979). Since the publication of Cynthia Irwin-Williams (1973) Arroyo Cuervo monograph, the attempt has been to tie Laguna area finds into the Oshara sequence (e.g., Grigg, Fosberg, and

Gauthier 1977). Gauthier and Lent (1978: 17), in a survey of Conoco's Bernable Road, suggested that two kinds of Archaic sites were present in the area: fall-winter camps, situated in areas of resource diversity (as in the Arroyo Cuervo area), and special-use sites selected for proximity to specific resources.

In excavations at the Moquino site, located 30 miles west of the Rio Puerco, Beckett (1973) identified the remains as representing, not the northern Oshara, but the southern Cochise tradition. Beckett suggests that Oshara tradition populations resided on the northern frontier of the Cochise occupation, and interprets some of the West Mesa Atrisco sites (Campbell and Ellis 1952) as Cochise.

The Moquino site yielded radiocarbon dates of 1950 B.C. and 265 B.C., suggesting to Beckett (1973:205) occupation from Chiricahua to San Pedro Cochise. The latter date came from the center of a shallow pithouse. Beckett (1973:66) identifies the occupation of the site as Cochise on the basis of projectile point form, the points at the Moquino site being distinctive from Oshara tradition points in the area.

This equation of projectile points with distinct socio-ethnic groups raises again the questions which were developed concerning the Anasazi/Mogollon border in the Cebolleta Mesa area. It is not unknown for hunting and gathering populations to manipulate projectile point form in order to convey information about social affiliation, for this phenomenon has been recently documented among the !Kung Bushmen of the Kalahari (Polly Wiesner, personal communication). Whether or not projectile points were used in the Moquino case to symbolize group identity remains an open question, albeit within the realm of plausibility.

Subsequent to the Archaic, the Laguna area was continuously occupied up to the historic period, although the record of this is scanty. Basketmaker (Peckham 1967b; Carroll and Hooton 1977) through historic Pueblo sites (Sciscenti 1962a; Bussey 1966; Wilson 1971a; Ellis 1974a, 1974b; Carroll 1979) have been recorded in the area, but little other than the presence of populations has been documented. Carroll (1979) has developed interpretations of temporal

change between early and late Pueblo at the Seboyeta Pumped Storage Facility. Noting that late Basketmaker/Pueblo I sites are located in what appear to be defensible locations (as were sites of this period at Cebolleta Mesa), he suggests a pattern of regional stress during this period.

This stress was apparently resolved, since by Pueblo II the locations of habitation sites no longer suggest conflict. The Pueblo II/Pueblo III occupation of this location was characterized by small habitation sites and limited activity locations, but after Pueblo III fewer Anasazi sites are noted in the area. Apparently, during this time population shifted to large, aggregated towns along major drainages, and the people practiced large-scale intensive agriculture. Carroll characterizes this as a large-group strategy, with both storage and labor management systems. Such a strategy would have provided greater long-term security, but would also have required intensification of labor, management of labor, storage, control of distribution, and accompanying social change.

Ellis (1974a) has demonstrated that Laguna was not established in the late 1600s, as is often believed, but that the archeological record indicates populations present in the immediate area at least two centuries earlier. She notes (Ellis 1974b) that there is a broad band of sites with Mesa Verde B/w extending from Grants around the western edge of Mt. Taylor and east to the Puerco and Jemez valleys (cf. Davis 1964). Ellis (1974b:45-49) believes that this distribution represents the movement of actual Mesa Verdean populations, some of which settled at Acoma and Laguna. She suggests that Laguna was distinguished as a tribal entity as early as 1300 A.D. (Ellis 1974b:57).

THE NORTH-CENTRAL SUBAREA

The San Mateo Valley And Vicinity

Archeological investigations in the north-central subarea have been overwhelmingly restricted to areas slated for minerals exploration. Independent research has been conducted in the area only on a sporadic basis (e.g., Bryan and Toulouse 1943; Bryan and McCann 1943; Agogino, 1957a, 1957b, 1960; Agogino and Feinhandler 1957; Agogino and Hester 1956, 1958; Harrison 1968;

Ambler 1977, 1978a, 1978b, 1978c). Nevertheless, the general prehistory of this area is definitely better known than that of Laguna.

The southern portion of the north-central subarea has been included in the Acoma Culture Province (see Map 13). It is discussed here as a separate entity because recent surveys have revealed a pattern of cultural evolution which differs from the Cebolleta Mesa area, and also because the area was more intensively involved in the organization that Altschul (1978) has termed the Chacoan Interaction Sphere.

The Archaic

Investigation of the Archaic phenomenon around Grants was begun by Bryan and Toulouse (1943; Bryan and McCann 1943), who described two stratigraphically separate occupations which were mainly preceramic. These were an earlier San Jose and a later Lobo occupation. Bryan and Toulouse (1943: 28) characterized these occupations as reflecting hunting and gathering people who largely pre-dated the succeeding Puebloan occupation. The temporal placement of the Lobo complex is enigmatic, for Lobo remains have been found around Grants in association with Puebloan pottery (as in the Cebolleta Mesa region). Bryan and Toulouse (1943:269) feel that this represents a close association between the hunting peoples and the Puebloan agriculturalists. Alternatively, it may reflect seasonal gathering activities on the part of the Puebloan occupants. This latter would be more likely if, as Schaafsma (1978b:10) suggests, the area was uninhabited between A.D. 1 and 800.

One of the San Jose sites in the Grants area has been radiocarbon dated at 6880 ± 400 years (Agogino and Hester 1958). In correlating the Grants Archaic sequence with the Oshara Tradition, Irwin-Williams (1973) placed the San Jose phase between 3000 and 1800 B.C., while equating the Lobo complex within the Armijo phase (1800-800 B.C.). If the termination of the Lobo complex in the Grants area did indeed occur so early, then the association of Lobo materials with Puebloan ceramics, if not archeologically spurious, merits serious attention.

Agogino (1960:46) characterizes the faunal resources of the San Jose phase as

including mule deer, pronghorn antelope, and bison. The presence of large numbers of milling stones indicates a major seed-gathering component to the subsistence round. In this regard, Agogino and Hester (1956) report finding amaranth seeds from one of the San Jose sites, seeds that were definitely not modern.

More recent research in the area has preferred to describe the Archaic occupation in terms of the Oshara sequence. There is an interesting topographic contrast in the distribution of Archaic sites. Survey in the lower elevation areas of the San Mateo Valley has revealed little evidence of Archaic occupation (Allan and others 1976), while in the surrounding higher elevations on the Cibola National Forest, Archaic occupation was extensive (Schaafsma 1978a; Powell 1978; Klager and Anschuetz 1979). Apparently, Archaic populations took the opportunity for gaining resource diversity which is provided in topographically diverse terrain. Later agricultural adaptations, in contrast, used more intensively the flatter, lowland areas where resource diversity was lower, but where farming was possible.

Schaafsma (1978a:52) has discussed some of the topographic determinants of Archaic settlement distribution near San Mateo Mesa. Sites were found located at the heads of side canyons that drain eastward into San Lucas Arroyo. Such sites were situated in relation to adjacent mesas, valleys, and seasonal water, that is, in a high diversity location. Of eight Archaic sites, the five largest were located near drainages holding seasonal water, and three of these were situated in sand dunes at the heads of these drainages. The remaining three camps were small. Two were found in elevated locations, and the third in a stabilized, south-facing sand dune. The higher mesa tops were used for hunting and gathering activities, indicated by projectile points and metates.

Puebloan Occupation

As noted, Schaafsma (1978b:10) believes that the San Mateo area was uninhabited between A.D. 1 and 800. This possibility has become less likely with the discovery of Basketmaker II remains on the Cibola National Forest (Powell 1978:21). In any event, the population of the area between

the Archaic and Puebloan occupations does not seem to have been high.

The major synthesis of the Puebloan occupation of the area has been compiled by William Allan (Allan and others 1976), based upon survey in the southern portion of the San Mateo Valley. Following Olson and Wasley (1956) and Breternitz (1966), Allan has derived a ceramic chronology for the area. This is reproduced here as Table 9. Overall, the earliest Anasazi occupation of the area occurred about 800 A.D. Population grew steadily until 950/1000, when a period of dramatic increase occurred (see Fig. 4). This large population was short-lived, and collapsed by 1075. A final, brief Anasazi occupation began about 1250, but ended by 1300.

Allan presents a climatic reconstruction for the area spanning the interval from 900 to 1885 A.D. (Allan and others 1976).

900-1100: Conditions in the survey area were generally moist, especially between 1000 and 1050. But subnormal moisture occurred during the last half of the eleventh century. During this period there was a shift in climate to summer dominant rainfall, an occurrence with adverse consequences for Puebloan agriculture. The period ended with a severe drought.

1100-1300: A general deterioration in climate began around 1250, and culminated in the Great Drought. But during the period from 1200-1250 moisture was above average.

1300-1500: A shift to summer dominant rainfall occurred again in this period. Intervals of above average moisture occurred between 1330 and 1430, and between 1455 and 1490.

1500-1700: There was a drought between 1560 and 1590, with a subsequent wetter period from 1610-1650. The increased summer rainfall ended around 1550 with a period of colder temperatures which probably shortened the growing season. These conditions lasted through 1885.

The initial Anasazi occupation of the area can be placed in Ceramic Group 3 (Kiatuthlanna phase, Pueblo I). Population during this period was small and dispersed. Site density was two per square mile. Architecture consisted of masonry-based

Table 9.
Ceramic Phase Sequence For The San Mateo Valley*

Group 3:	Kiatuthlanna phase, Pueblo I. Kiatuthlanna B/w (825-910), White Mound B/w (675-900).
Group 4:	Early Red Mesa phase, early Pueblo II. Kiatuthlanna B/w (825-910), Red Mesa B/w (850-1050).
Group 5:	Late Red Mesa phase, Pueblo II. Red Mesa B/w (850-1050) greater than Gallup B/w (100-1125), Escavada B/w (925-1125).
Group 6:	Wingate phase, late Pueblo II. Small amounts of Red Mesa B/w, Gallup B/w (1000-1125), Escavada B/w (925-1125), Puerco B/w (1010-1150), Wingate B/r (1050-1200), Puerco B/w(1030-1175), San Mateo B/w, McElmo B/w.
Group 7:	Hosta Butte phase, early Pueblo III. Group 6 plus Chaco B/w (1050-1125), small amounts of St. Johns Polychrome and B/r (1175-1300), Reserve B/w, Socorro B/w, Klageto B/w, Houck Polychrome.

*After Allan and others (1976:108-109).

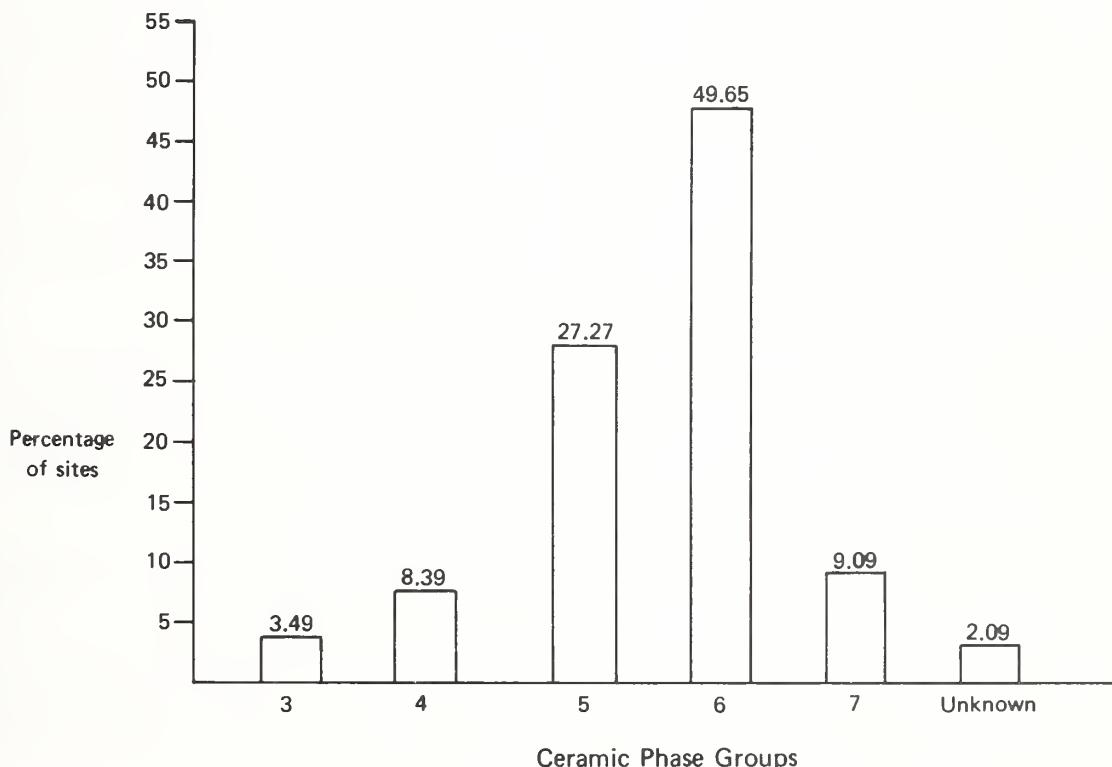


Figure 4. Population Trends In the San Mateo Valley (after Allan and others 1976:114). Reproduced by permission of the author.

jacal structures of one or two rooms. The dispersed settlement pattern suggests dry farming of favorable areas of alluvial flats.

Ceramic Group 4 (early Red Mesa phase, early Pueblo II) exhibits a slightly larger but equally dispersed population. Site density averages 4.8 per square mile (see Map 16). These sites display evidence of masonry-based jacal structures of one or two rooms. Subsistence strategy was similar to Group 3. There was no concentration of sites within specific vegetative or physiographic zones, although all sites were in close proximity to alluvial flats.

Ceramic Group 5 (late Red Mesa phase, Pueblo II) witnessed a substantial population increase (see Map 17), and the beginnings of population aggregation. Site density increased to 15.6 per square mile. Pueblos were constructed of masonry, four or five or more rooms in a row, oriented north-south. Kivas were present (including one Great Kiva), and were almost always to the east of the room block. Population began to aggregate on a ridge along the southern edge of the valley (see Map 17). Correspondingly, one or two room field houses were situated near alluvial flats.

It is during this period that the area begins to overtly exhibit Chacoan affiliations, and Allan accordingly postulates a population influx at this time (Allan and others 1976:65). Construction began on the El Rito site, a Chacoan outlier. This site is an L-shaped structure with up to 55 rooms, 3 regular kivas, and a Great Kiva. It may have stood three stories high. Exposed masonry is the same as Hawley's Type I masonry in Chaco Canyon, where it dates between 945 and 1030 A.D. This site was placed on a ridge, a location of high visibility. Occupation of the site continued into Group 7.

A water control system involving irrigation canals, check dams, and diversion dams was present in the area, and may have been built during this period.

Group 6 (Wingate phase, late Pueblo II) exhibited the largest population. There are almost twice as many sites as in Group 5, with a density of 28.4 per square mile. Actually, this average figure is misleading, since most of the sites were confined within one-half square mile (see Map 18). Populations aggregated on a flat

ridge which was well drained with abundant sandstone nearby. It is the only locality in the area with these characteristics. This ridge is above and in close proximity to an alluvial flat with a perennial stream, a good agricultural area.

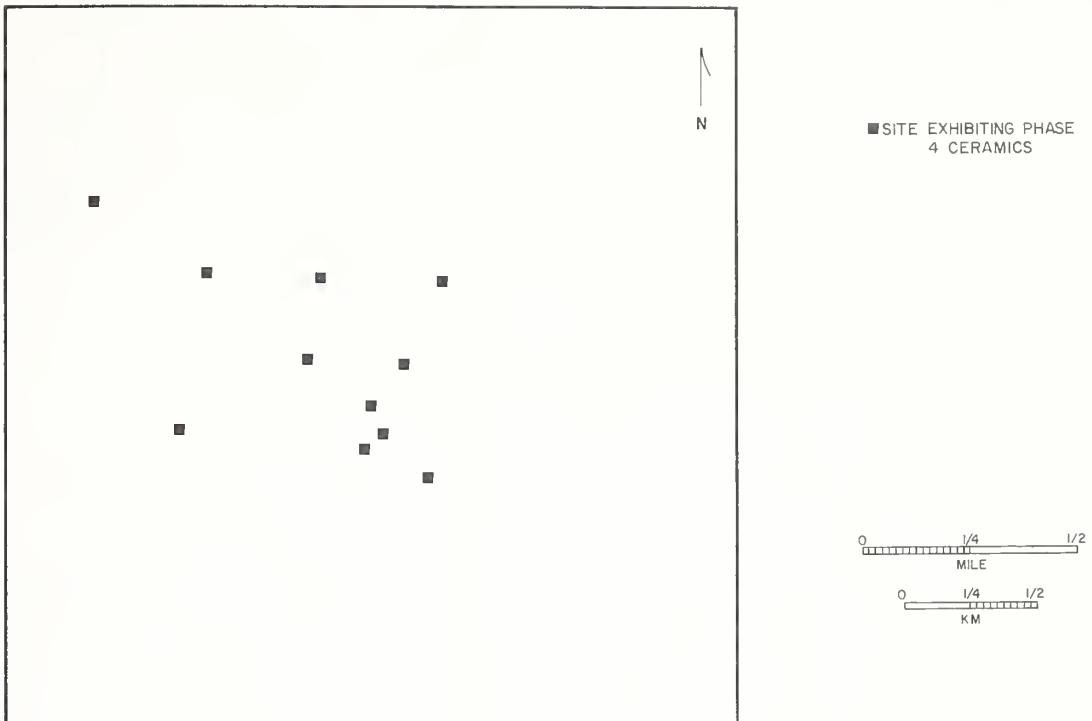
Habitation structures were mainly linear room blocks, containing 6 to 15 rooms, oriented north-south. Some of the larger villages have two kivas, situated to the east of the room block. The water control system was certainly in operation during this period.

Some habitation sites during this time were dispersed away from the central cluster. These are generally found on the east slopes of small hills or ridges. Field houses were also dispersed, being almost twice as abundant as in Group 5. In general, there was a reduction in the area used for habitation, with an expansion in the area used for cultivation.

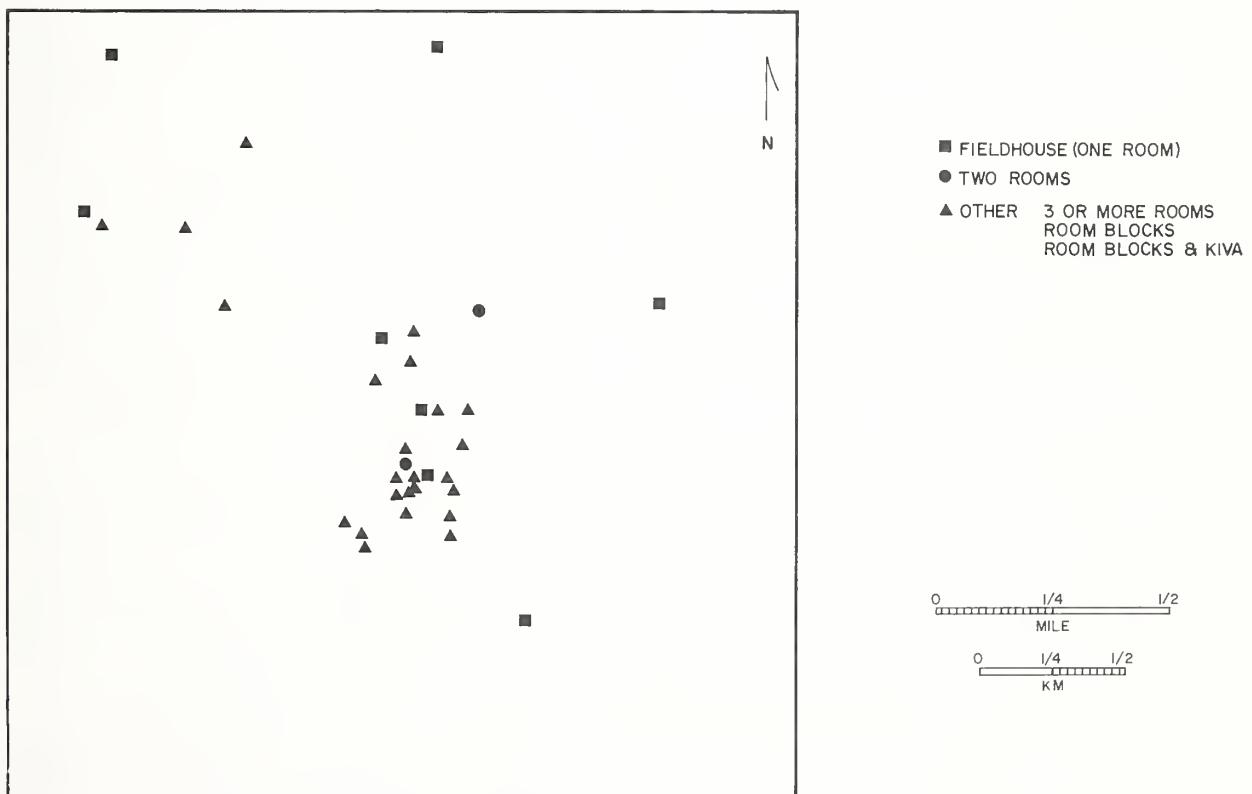
Substantial depopulation of the area occurred during Group 7 (Hosta Butte phase, early Pueblo III). In early Group 7, site density dropped to 5.2 per square mile. The area was then abandoned for a period of 200 years, with a subsequent, brief occupation after 1250 (late Group 7). The population of this last occupation made a Mesa Verdean style pottery, and used only the El Rito site. This Chacoan outlier was used for reoccupation because, being of massive construction, its walls were still standing (Allan and others 1976:65; Davis 1964:137).

Allan (Allan and others 1976:70-76) has developed an explanatory model to account for the archeological characteristics of the Anasazi occupation. This model is couched in terms of a series of propositions, which follow:

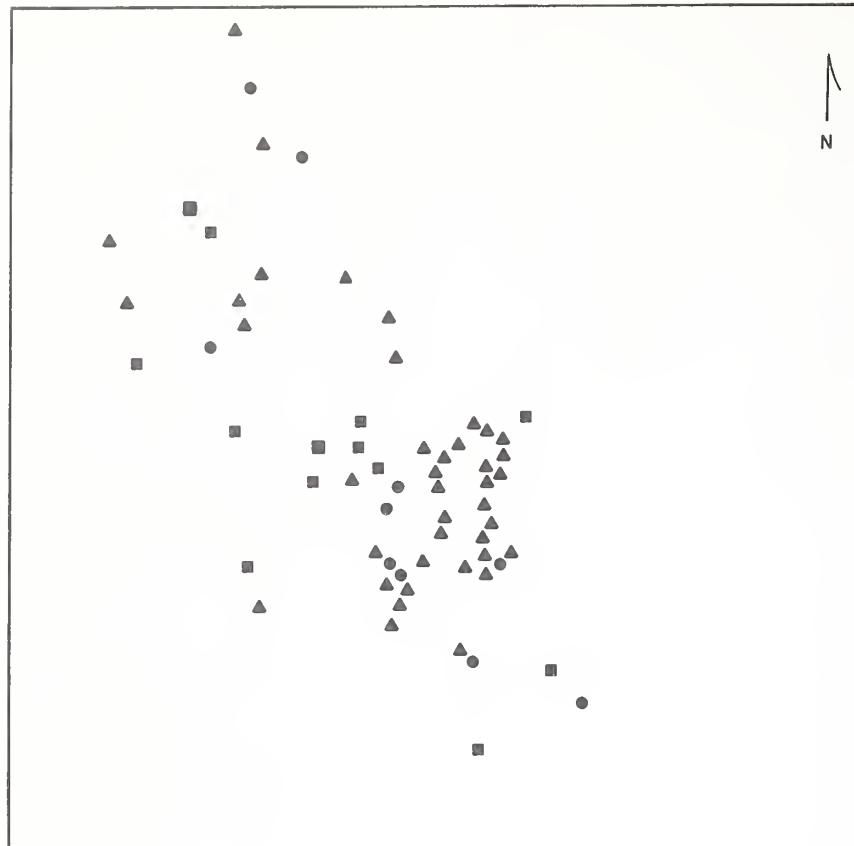
- 1) Agriculture in this area was productive when diversion irrigation was employed.
- 2) Resource productivity may have declined in the eleventh century because of the shift to summer dominant rainfall and the general deterioration of climatic conditions.
- 3) The phenomena of population aggregation and labor intensive agriculture may be related to a variety of conditions: a) population increase in an arid environment, b) localized high population density in



Map 16. Distribution Of Phase 4 Sites In The Southern San Mateo Valley (after Allan and others 1976:124). Reproduced by permission of the author.



Map 17. Distribution Of Phase 5 Sites In The Southern San Mateo Valley (after Allan and others 1976:125). Reproduced by permission of the author.



■ FIELDHOUSE ONE ROOM
 ● TWO ROOMS
 ▲ OTHER 3 OR MORE ROOMS
 ROOM BLOCKS
 ROOM BLOCKS & KIVA

0 $\frac{1}{4}$ $\frac{1}{2}$
 MILE

0 $\frac{1}{4}$ $\frac{1}{2}$
 KM

Map 18. Distribution Of Phase 6 Sites In The Southern San Mateo Valley (after Allan and others 1976:126). Reproduced by permission of the author.

favorable agricultural areas, or c) colonization of the area by populations already practicing an aggregated land-use strategy.

4) Labor intensive water control developed as a response to increased population.

5) The construction and maintenance of large-scale water control systems required the development of a managerial hierarchy.

6) Such a hierarchy will organize people for participation in other types of public works projects than irrigation. These projects will result in the construction of physical manifestations of social integration and identity, such as Great Kivas. If the local community was part of a larger, regional entity, other public works projects might be oriented toward fulfilling obligations to this larger unit. Allan places the building of roads and tower kivas in this latter category.

7) Finally, irrigation agriculture might lead to increasing salinization of fields, a common occurrence in arid lands. The result would be decreasing crop yields.

To paraphrase these propositions, Allan believes that increasing population density, occurring at a time of climatic deterioration, and coupled with dense settlement in the most favorable agricultural area, led to a situation where the population could be maintained only through the development of labor intensive methods for increasing agricultural productivity per unit of land. The solution chosen was the construction of a diversion irrigation system. Following Wittfogel (1957), Allan sees the need for organizing labor to construct and maintain this system as requiring the establishment of a managerial elite. Allan advances the possibility that this elite may have comprised immigrants with Chacoan characteristics. The management of labor extended to other types of public works projects, some symbolizing group identity (such as Great Kivas), others fulfilling obligations to the regional political hierarchy (roads, tower kivas). Yet such a strategy was doomed to short-lived success in this fragile environment. Irrigation resulted in buildup of salts in agricultural fields. The resulting decline in crop yields brought

the collapse of the hierarchical social system, and ultimately necessitated the abandonment of the region.

Allan's model is a refreshing departure from the usual lack of interpretation and synthesis in contracted survey reports. This model may or may not stand the test of time. Whether it does is largely immaterial. Allan is to be congratulated for developing a useful interpretation which provides a framework for future studies.

In the uplands surrounding the San Mateo Valley, scattered Puebloan occupations have been found. Near San Mateo Mesa, it was found that the majority of Anasazi sites avoided the high mesas. Most were situated in lower areas of high topographic relief. The majority of these sites date between 1000 and 1050 A.D. These dates coincide with the major occupation in the area of Allan's survey, and were an extension of that occupation (Schaafsma 1978a:54). In other portions of the Cibola National Forest surrounding the San Mateo Valley, pithouse sites, field houses, and special use sites have been documented (Koczan 1977; Koczan and Doleman 1976). Those portions of the forest which were not used for habitation during the Puebloan occupation were apparently used for summer agriculture (where feasible) and for foraging activities.

In a survey of the San Mateo Mine area near La Jara Mesa, Ambler (1978) defined four environmental zones which were related to prehistoric human occupation. Zone 1 included the escarpment and talus below La Jara Mesa. Zone 2 consisted of a series of north to south trending ridges and valleys, steep and rocky territory. Zone 3 terrain consisted of large, flat, sandy areas. Zone 4 included an area of low sandy ridges and valleys at lower elevations.

Ambler (1978:33) notes that the larger pueblo sites of 5 to 15 rooms, dating to the Wingate phase (early Pueblo III), all occur in Zone 4. Smaller pueblo sites occur in Zones 3 and 4, temporary, special use sites in Zone 2, while Navajo sites are found in Zone 2, close to Zone 4. Ambler suggests (1978:39) that population pressure in Zone 4 may have necessitated settlement in Zone 3, and possibly Zone 2. He also suggests, though, that these settlement distributions may only reflect idiosyncratic choice.

Compiling the available information from previous surveys in the area, Beal (1977:4) has developed a set of environmental characteristics to predict site distribution in this area. Beal's chart is reproduced here as Table 10. This table is preliminary, and does not appear to encompass all available information. Nevertheless, it

Table 10.
Environmental Correlates Of Settlement Distribution In The San Mateo Area*

Archaic	Stabilized dunes at divides or canyon heads; elevated areas above alluvial or eroded drainages; natural rock shelters; proximity to water; high mesa tops (isolated lithic scatters only); pinyon-juniper, grassy dunes.
Pueblo	Slight elevations adjacent to alluvial floodplains and intermittent water sources; pinyon-juniper/grassland ecotone; natural rock outcrops; special use sites on mesa tops in pinyon-juniper or ponderosa.
Navajo	Sheltered, elevated alcoves; proximity to natural rock outcrops; escarpments or broken slopes; canyon heads; pinyon-juniper; pinyon-juniper/ grassland ecotone.
Spanish	North slopes overlooking open grasslands; margins of valleys; proximity to villages; pinyon-juniper/grassland ecotone.

*after Beal (1977:4).

exemplifies a type of compilation useful for land management planning. More such formulations need to be attempted.

Curtis Schaafsma (1978b) has recently proposed that the San Mateo area be recognized as a distinct archeological entity, to be called the San Mateo Archeological District (see Map 19). The boundaries of this district are defined both archeologically and physiographically. The main portion of the district encompasses the upper drainage basin of San Mateo Creek, as well as the headwaters of Arroyo Chico. Unfortunately, Schaafsma's report does not detail the criteria by which the district was defined, nor discuss the social and cultural significance of this formulation. Since this is a particularly significant idea, further documentation of it should be forthcoming.

Outside of the San Mateo Valley area archeological investigations have been sporadic. Emma Lou Davis (1964:135-147) conducted extensive surveys of the area for sites with Mesa Verdean ceramics, to test ideas about dispersal of populations from the northern San Juan Basin. Schaafsma (1978b) surveyed the area of the South Hospah Mine, immediately to the north of the overview area. Remains of PaleoIndian, Archaic, Basketmaker, Pueblo, Navajo, and historic occupation were found. The area was marginal in resource potential, and displays no indications of permanent occupation.

Chacoan Outliers

Three Chacoan settlements are known to exist in the north-central subarea: El Rito, San Mateo, and Kin Nizhoni. The first of these has already been described. The San Mateo site lies at the northern end of the San Mateo Valley, while Kin Nizhoni lies a few miles to the west. Recent investigations of aerial remote imagery by Margaret Obenauf of the Remote Sensing Center, University of New Mexico, have yielded indications that these sites are interconnected by a prehistoric road network. Another road leads north from the San Mateo site over the Cibola National Forest, and intersects with roads leading to Kin Ya'a and Chaco Canyon. If the remote sensing interpretations are valid, it would appear that the San Mateo Valley was closely linked with the Chacoan Interaction Sphere.

The San Mateo site is the largest known Chacoan ruin in the Red Mesa Valley area. It contains between 95 and 112 rooms, was three stories high, held five regular kivas, was associated with two Great Kivas, and dates between 1000 and 1125 A.D. (Marshall and others 1979).

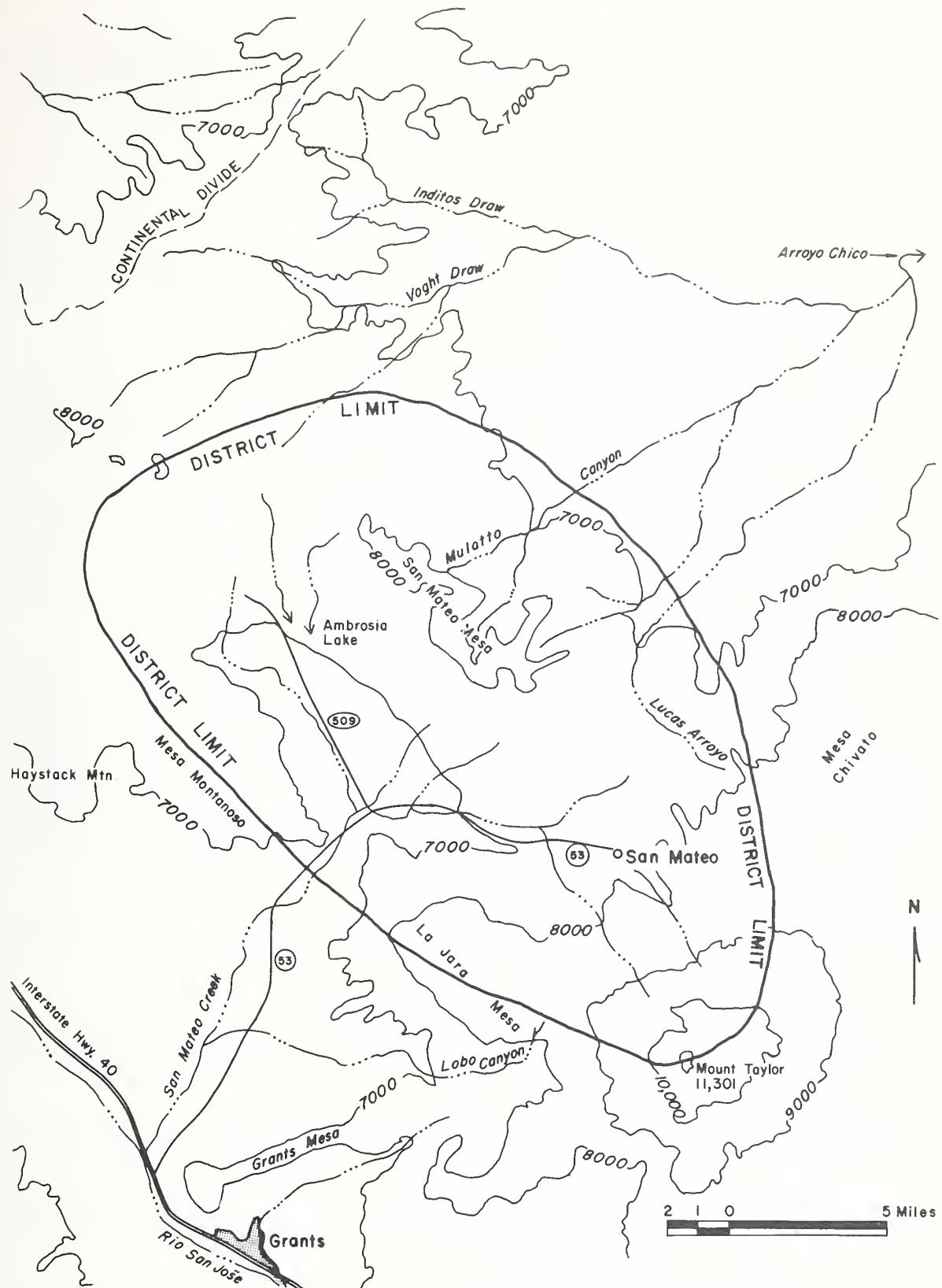
The Kin Nizhoni community consists of a rather dense cluster of pueblo structures. This cluster includes 86 domiciliary structures in an area of approximately three square km. Two large masonry buildings served as apparent public buildings. They contained 10 and 14 rooms respectively, may have been multistory, contained interior kivas and multiple middens, and were linked to roadways. Lower Nizhoni ruin exhibits a Pueblo II ceramic assemblage, while Kin Nizhoni shows early Pueblo III affinity. The two date between 950 and 1100/1125, and are connected by a roadway. Marshall and others (1979:174) believe the settlement to be intrusive.

THE NORTHWESTERN SUBAREA

The northwestern subarea is by far the most intensively investigated of the overview area, yet in many ways I find it the most difficult to review. Studies in the area have included Gladwin's (1945) classic, pioneering analysis of the Chaco Branch, Weaver's (1978) study of Manuelito Canyon, a multitude of salvage projects dealing with pipeline and highway construction, and an even greater multitude related to minerals development. Yet with the exception of Weaver's (1978) study, which is restricted to Manuelito Canyon, there has been no major synthesis of this area since Gladwin's time. And, again except for Weaver, no synthesis focusing on problems other than classification and chronology has been attempted.

The Red Mesa Valley/ Lobo Mesa Area

The scheme for archeological classification which Gladwin developed is a hierarchical one (1945; Gladwin and Gladwin 1934): the root-stem-branch-phase system. As an example, in Gladwin's system the Basketmaker root has two stems: The San Juan and the Little Colorado. The Little Colorado stem in turn has four branches: the Chaco, Cibola, Salado, and



Map 19. Proposed San Mateo Archeological District (after Schaafsma 1978b). Reproduced by permission of the author and the School of American Research.

Mimbres. Each branch in turn is comprised of a series of phases (Gladwin 1945:3). In others words, Gladwin sees an ascending system of hierarchical relationships in which the higher order nodes reflect archeological similarities of a more generalized nature. Gladwin's work in the Red Mesa Valley focused on delineation of the Chaco Branch.

Gladwin does not discuss the sociocultural reality of his taxonomic units. However, he often writes as if the populations of his branches possessed sociocultural and political unity. For example, he talks of Kayenta pressure against northwestern Chaco settlements (Gladwin 1945:96), as if the Kayenta were a unified population actively campaigning to displace another unified population, the Chacoans. What is more, he bases such interpretations on the occurrence of archeological traits such as pottery complexes. The problems involved in deriving socio-ethnic groups from archeological traits have been discussed previously. It would undoubtedly be informative to consider the patterns Gladwin documented in terms of trade and interaction areas, rather than solely in terms of population replacement.

Nevertheless, the cultural/temporal sequence Gladwin derived has been used, with occasional modifications, by most subsequent investigators, and has largely stood the test of time. Gladwin sees the Chaco "culture" as extending from the San Juan River in the north to Crownpoint in the south, and from Mt. Taylor in the east to the Chuskas in the west (1945:7). He sees

Chacoan influence as being strongest near Red Mesa, with Kayenta influence strongest near Holbrook, Arizona and along the western Chuskas (1945:10). Gladwin's basic cultural/temporal sequence is as follows (1945:38-80).

White Mound phase (early Pueblo I)
Kiatuthlanna phase (later Pueblo I)
Red Mesa phase (early Pueblo II)
Wingate phase (later Pueblo II)
Hosta Butte phase (early Pueblo III)
Bonito phase (later Pueblo III)

Various problems in Gladwin's sequence have been pointed out (Kluckhohn 1939) and revisions of it made. It has been known for some time that the Hosta Butte and Bonito phase sites were contemporaneous in Chaco Canyon. There has been a suggestion that the Wingate phase may have been contemporaneous with the Hosta Butte phase (Wendorf and Lehmer 1956:193), that the Wingate phase is a localized manifestation of the Rio Puerco of the West (the reader should keep in mind that there are two Rio Puercos in the overview area), and that the Hosta Butte phase is localized in the Chacoan heartland. Wendorf and Lehmer (1956:194) suggest that the four earliest phases of Gladwin's Chaco Branch should actually be assigned to a new unit termed the Puerco Branch. The Chaco Branch, centered in the Chacoan heartland, should also be revised. Accordingly, Wendorf and Lehmer (1956:195) suggest the sequence shown in Table 11.

Wendorf and Lehmer's proposed revision has not been used recently, perhaps in part

Table 11.

Relationship Between Puerco and Chaco Branches, as Suggested by Wendorf and Lehmer (1956)

Pecos Classification	Puerco Branch	Chaco Branch
Pueblo III	Puerco PIII	Bonito phase
Pueblo III	Wingate phase	Hosta Butte phase
Pueblo II	Puerco late PII	Chaco late PII
Pueblo II	Red Mesa phase	Chaco Red Mesa
Pueblo I	Kiatuthlanna phase	Chaco PI (Piedra?)
Basketmaker III	White Mound phase	La Plata phase

because they believed the Hosta Butte and Bonito phases to be temporally distinct. Wendorf and Lehmer do not discuss the important question of how the archeological characteristics they use to derive these schemes may be expected to reflect socio-cultural distinctions.

More recently, Harrison (1976) has modified Gladwin's scheme by adding the McElmo phase. With this revision the scheme now stands as shown in Table 12.

Table 12
Gladwin's Classification, as
Modified by Harrison (1976)

Pecos Classification	Modified Gladwin
Late Pueblo III	McElmo phase
Early Pueblo III	Hosta Butte/ Bonito phases
Late Pueblo II	Wingate phase
Early Pueblo II	Red Mesa phase
Pueblo I	Kiatuthlanna phase
Basketmaker III	White Mound phase

The most recent characterization of these phases has been presented by Harrison (1976:26-29). The White Mound phase was characterized by a combination of pithouse and surface architecture. Ceramics include Lino Grey, White Mound B/w, and a red smudged ware, possibly Woodruff Smudged. This last may be an import from east-central Arizona. Projectile points were thick and heavy with basal or lateral notching.

During the Red Mesa phase small, above-ground masonry units, linearly arranged, were built. Kivas and trash mounds have been documented. Corrugated pottery makes its first appearance. Red Mesa B/w and Escavada B/w are frequent.

In the Wingate phase pueblo structures were often larger and two-tiered. Features such as kivas and trash mounds became more visibly distinct. The ceramic assemblage includes Escavada B/w, Gallup B/w, possibly Wingate B/r, and a grey corrugated ware.

The Hosta Butte/Bonito phases essentially terminate the Anasazi occupation of the area. According to Harrison (1976:29) this period is represented at Peckham's (1963a) bi-walled kiva near Tohatchi. Sites of this phase sometimes consist of more than one room block, and are up to four stories high. Structures exhibit rectangular, L,

U, and E shapes in one to three tiers. Multiple kivas occur in plazas or in room blocks. There is more than one trash mound per site. Chaco B/w and McElmo B/w make up more than half of all black-on-white pottery. Also present are Escavada B/w, Gallup B/w, Wingate B/r, and Puerco B/r. St. Johns Polychrome appears at the end of the sequence. Corrugated varieties include Exuberant and Coolidge.

Criticisms of this framework (and related attacks on the Pecos classification) have been based upon inconsistencies in covarying traits. Wilson (1962a), for example, notes that the Horseshoes site classifies clearly as Pueblo II, but doesn't fit well into any of Gladwin's phases. The style of masonry and the presence of Puerco B/r suggest Wingate phase, but the presence of a pithouse and Red Mesa B/w suggest Red Mesa phase. Similarly, Wendorf (1954a) discusses a Pueblo III site near Gallup which would ordinarily fall into Gladwin's Wingate phase. However, the presence of McElmo-Mesa Verde sherds suggests occupation as late as 1100 A.D., contemporaneous with the Hosta Butte phase. Olson and Wasley (1956: 357) describe a site which is Pueblo II by typology, Pueblo III by date. These three cases, while directed at existing classifications, are, as Cordell and Plog (1979) have noted, strong indictments of the normative classifications commonly used in the Southwest.

In a general study of Pueblo II archeology in this area, Bussey (1964) suggested that the Red Mesa phase should be considered transitional between the Pueblo I and Pueblo II periods, the Hosta Butte phase transitional between Pueblo II and Pueblo III, and the Wingate phase classic Pueblo III. Following Olson and Wasley (1956: 271), who postulated a division between the Acoma Branch and the Puerco area of the Chaco Branch around Bluewater (based upon ceramics), Bussey (1964:102-103) suggests that the upper Rio San Jose area was a distinct cultural unit of the Chaco Branch, at least during the late Pueblo II period. Bussey goes on to suggest that this area may have been abandoned due to drought between 1036 and 1041 A.D.

Hargrave (1962) has developed a major reevaluation of the ceramics of the Prewitt District. He recognizes three distinct indigenous wares: Cibola White Ware (consisting of Kiatuthlanna B/w, Red Mesa

B/w, Puerco B/w, Escavada B/w, and Gallup B/w), San Mateo Grey Ware (Bluewater B/g, Las Tusas B/g, San Jose B/g), and Cibola Grey Ware (Tohatchi Banded, Coolidge Corrugated, Tseh-so Corrugated). Noting confusion surrounding Puerco B/w, he suggests that it is actually three types, lumped together because of similar design style. Hargrave feels that, since design styles may be shared, local populations and temporal periods should be delineated by analysis of raw materials and techniques of ceramic manufacture. Noting that the Prewitt ceramics differ in temper from the Puerco-Chaco series, he proposes (1962:11) a new Prewitt series, consisting of three old types (White Mound B/w, Kiatuthlanna B/w, Red Mesa B/w) and two new ones (Grants B/w, 950-1075 A.D. and Prewitt B/w, 975-1050 A.D.).

Two major studies of pipeline routes through the area have produced results worthy of note. Olson and Wasley (1956), in a survey between the San Jose and western Puerco valleys, suggested that Chacoan influence extended as far south as Bluewater. Earlier in time cultural differences over large areas were not marked. The greatest number of sites they encountered dated to the Pueblo II period. During the Pueblo III phase, the center of population in the western Rio Puerco moved downstream toward the Little Colorado River.

In a more recent pipeline survey for the Gas Company of New Mexico, Gauthier and Stein (1977) proposed to test the hypothesis that site density and topographic diversity will covary, that placement of sites is directly dependent upon topographic variation. The survey began north of Chacra Mesa, proceeding southwesterly to a point northwest of the San Mateo Valley, and from there westerly through the Red Mesa Valley. The results of the survey proved to be ambiguous in terms of assessing the hypothesis. This is not surprising since, as described for the eastern and north-central subareas, Archaic and Puebloan populations seem to have followed different settlement location strategies. Expecting this hypothesis to apply to all time periods is probably unrealistic.

Navajo sites recorded in the survey were located in close proximity to grassland areas. This pattern is clearly a function of a pastoral economy. Concentrations of

Navajo sites occur around Chacra Mesa and near the Continental Divide.

Anasazi sites were situated near drainages or large alluvial flats. Such locations presumably afforded good soil and moisture conditions for agriculture. Two clusters of Anasazi sites occurred northwest of the San Mateo Valley. One of these was associated with the Casamero site, a Chacoan outlier (Sigleo 1966, 1967). Anasazi sites were also located in the Red Mesa Valley overlooking drainages or alluvial flats from slightly elevated locations. Site density was lower than around Casamero, but occupation was contemporaneous. The Anasazi sites show similarities in masonry, orientation, and ceramic types. Gauthier and Stein (1977:16-17), following earlier investigators, believe that the Anasazi populations of this area were part of the larger Chacoan regional system.

Archaic sites were limited to the area between Chacra Mesa on the north and the northwestern edge of San Mateo Mesa on the south. This is a large expanse of low topographic relief with numerous east flowing drainages and a grassland character. Only two Archaic sites and a few isolated occurrences were found. These sites yielded San Jose (3000-1800 B.C.) projectile points. Gauthier and Stein (1977: 18-19) note that, despite the low topographic relief of the area where Archaic sites were found, nevertheless vegetative diversity was high because each drainage, surrounded by alluvial flats, contains vegetation types that are distinct from the surrounding elevated areas.

Archeological remains in the pipeline survey spanned the period from the White Mound phase (excluding the two Archaic sites) to the historic era. The number of sites encountered in the survey increased from the Kiatuthlanna phase through the Red Mesa and Wingate phases (Gauthier and Stein 1977:43).

Turning to the apparent integration of the Red Mesa Valley with the Chacoan Interaction Sphere, Gauthier and Stein (1977: 46-49) suggest that the geographic and population expansion which characterized the Pueblo II period, possibly spurred by favorable climatic conditions, ultimately produced a situation where floodwater control and irrigation were necessary to increase crop yields. Anasazi

populations of the Red Mesa Valley maintained several farming strategies at the same time. Clustered settlements are found near narrow sections of large drainages where water control devices could have been placed. The settlement concentration at these locations would have provided the work force needed for irrigation agriculture. Dispersed sites are located on alluvial flats, benches, or mesas overlooking small drainages. Gauthier and Stein suggest dry farming or floodwater farming at such locations.

Gauthier and Stein believe that this maintenance of diverse farming strategies was advantageous in an arid environment since, if floodwater farming failed during one year, the irrigation system might succeed. Thus, a mixed strategy would minimize the risk of total crop failure. Although Gauthier and Stein are careful not to relate this interpretation to the phenomenon of superordinate settlements which is the hallmark of the Chacoan system, nevertheless it is not far-fetched to see Bonito phase Chacoan towns as the locus of a managerial elite involved not only in coordinating labor forces, as Allan (Allan and others 1976) has suggested, but also in centralizing and distributing surplus food resources. Such a pooling and dispersal system would have provided an efficient means of realizing the benefits of a diversified agricultural base. Gauthier and Stein do suggest that the Chacoan outliers were the habitation loci for only a high status minority, with the bulk of the population residing in the smaller, surrounding pueblos.

Gauthier and Stein note that many Chacoan outliers are located in areas of high agricultural potential. They go on to observe that the El Rito outlier was established around 950 A.D. in a favorable agricultural area. This contrasts with the nearby Casamero site which was established around 1050 in a less favorable zone. Based upon this, they propose that, in general, the date of establishment of Chacoan outliers will vary with the agricultural potential of the setting. If true, this may have important implications for understanding the development of the Chacoan system, as will be discussed in the next chapter.

As with Allan's study, Gauthier and Stein's interpretations are a welcome contrast to

the lack of synthesis and evaluation in most contract survey reports.

Bluewater Lake lies at the southeastern edge of the area usually considered the Chaco Branch. A survey has been conducted in this area by Gauthier, Acklen, and Stein (1977). They observed Archaic sites (Jay and Bajada phases) adjacent to playa areas and near the bases of two small sandstone mesas. Anasazi sites were found adjacent to small drainages, and on alluvial flats. Gauthier, Acklen, and Stein (1977:24) suggest decreased contact between Chaco Canyon and the southern Chacoan outliers in the latter part of the eleventh century. They believe there was a shift in emphasis from the southern outliers to the northern and northwestern ones in the Chuska Valley and the San Juan drainage. Gauthier, Acklen, and Stein base this conclusion on the introduction of McElmo phase pueblos and the dominance of trachyte tempered ceramics in Chaco Canyon prior to its abandonment. The relative lack of McElmo B/w and classic Chaco B/w from the Rio San Jose and the Red Mesa Valley suggests to Gauthier, Acklen, and Stein that the southern outliers were abandoned early. After the abandonment of the outliers, the southern populations shifted toward Zuni and Acoma during a drought between 1100 and 1140 A.D.

Early Anasazi Social Organization In The Northwestern Subarea

As part of the highway salvage program for the construction of Interstate 40, James Sciscenti (1962b) excavated LA 4487, a late Basketmaker III/early Pueblo I site near Manuela, dating between 780 and 810 A.D. Eight pithouses were present, along with 25 contiguous surface rooms and a trash mound. Pottery included Lino Grey, White Mound B/w, Woodruff Smudged, Kana'a Grey, and Kiatuthlanna B/w. Sciscenti assigns the site to the White Mound phase, and suggests both Mogollon and Anasazi affiliations for the occupants. Two kinds of pithouses were present: D-shaped ones, each with a bench and a majority of southern pottery, and roughly circular, benchless ones, with northern pottery.

But the most important find at this site was a cemetery from which at least 30 burials were taken. Complete sets of mortuary data are rare in Anasazi sites,

and so this set of burials affords a unique opportunity to investigate aspects of early Puebloan society in this area, at least as this is reflected in mortuary remains. Mortuary remains are promising in this regard, for as Christopher Peebles (1977: 124) has observed, "A human burial contains more anthropological information per cubic meter of deposit than any other type of archeological feature." Since Sciscenti's report (1962b) did not list the primary data from these inhumations, the original fieldnotes from the excavation, on file at the Laboratory of Anthropology, Museum of New Mexico, were consulted. While some ambiguities and uncertainties were found in these notes (for example, it is not known whether the entire cemetery was excavated), these were minor, and the data leading to the following study were of a quality suitable for the interpretations to be presented. Ageing and sexing of the skeletal material was done by Erik Reed (1962c).

The approach to deriving inferences about characteristics of past societies from mortuary remains posits a relationship between the form of a mortuary ritual on the one hand, and the social characteristics of both the deceased individual and the persons engaged in the ritual, on the other. This idea, which has been ethnographically validated (Saxe 1970; Binford 1971), suggests that archeologically observed variations in mortuary ritual may be used to derive information about the social characteristics of deceased individuals, and by extension, concerning the organizational characteristics of the societies in which they held membership.

It is fundamental that, for reliable social inferences to be achieved, cross-culturally valid interpretive principles must be developed. To date, two social variables have benefited from this. They are rank differentiation and corporate group differentiation.

The analysis of rank differentiation depends on the observation that, as one ascends a social hierarchy, the size of the population recognizing obligatory status responsibilities to an individual increases. Based upon this principle, it has been proposed that persons of higher rank will be entitled to larger degrees of social involvement and activity disruption in mortuary ritual (Binford 1971:17, 21), and that this will result in increased

energy expenditure in mortuary ritual (Tainter 1973). Energy expenditure will in turn be reflected in such features of burial as size and elaborateness of the interment facility, method of handling and disposal of the corpse, and the nature of grave associations. This interpretive framework has been ethnographically validated (Tainter 1975).

The analysis of corporate group organization proceeds on the basis of an interesting hypothesis set forth by Arthur Saxe:

To the Degree that Corporate Group Rights to Use and/or Control Crucial but Restricted Resources are Attained and/or Legitimized by Means of Lineal Descent from the Dead (i.e., Lineal Ties to Ancestors), Such Groups will Maintain Formal Disposal Areas for the Exclusive Disposal of their Dead, and Conversely (1970:119).

This proposition has also received ethnographic confirmation (Saxe 1970; Goldstein 1976). Goldstein's (1976) study indicated that, in non-industrial societies, the presence of formal cemeteries is always associated with corporate groups practicing lineal descent, and that most, but not all, such groups use formal disposal areas.

The primary data from the fieldnotes are shown in Table 13. The most important mortuary attributes seem to be burial orientation, position, placement, type of burial facility, and nature of associations. Since position and placement of the body show little or no variation in this sample, they have not been included in the analysis. Burial orientation shows a clear modal orientation to the south and southwest (see Table 14). Of 21 individuals with recorded orientations, 13 (62 percent) were oriented in the modal direction.

Type of burial facility is the attribute which shows the major contrasts in energy expended in the mortuary ritual. As such, it is the most important variable in the analysis. Three types of burial facility were present: log covered graves, slab lined graves, and simple earthen graves.

Grave associations were more ambiguous. Types of associations included undecorated ceramic vessels, painted pottery, an effigy

Table 13.
Burial Data From LA 4487

Burial Number	Age	Sex	Orientation	Position	Placement	Burial Facility	Associations
1	12-18		SE			Grave	
2	Adult	F	NE	Flexed	Left Back	Log Covered	Lino Grey jar, B/w bowl
3	Adult	M	SW	Flexed	Back	Log Covered	11 Olivella shell beads, 3 red stone beads, 1 White Mound B/w bowl, 1 grey jar Broken pot
4	Adult	M	SW	Flexed	Back	Log Covered	
5	Adult	M	W	Flexed	Back	Grave	Pitcher
6a	4-12		N			Grave	
6b	4-12		N			Grave	
6c	4-12					Grave	Shell pendant
7	Adult	F		Flexed	Back	Slab Lined	
8	Adult	M	E	Flexed	Back	Grave	B/w bowl, pitcher
9	12-18		W	Flexed*	Back	Grave	
10	Adult	M		Flexed	Back	Grave	5 pottery vessels
11	12-18			Flexed	Back	Grave	
12	4-12			Flexed	Back	Grave	1 jar, 1 bowl
13	Adult	F**					
14	4-12						
15	Infant				Back		Small smudged ware bowl
16	Adult	M	S	Flexed	Back	Log Covered	1 grey ware, 1 fugitive red duck pot
17	4-12		SW	Flexed	Back	Grave	
18	Adult		S	Flexed	Back	Grave	
19	4-12						
20	Adult	M	S	Flexed	Back	Grave	1 bowl
21	Adult	M	SW	Flexed	Back	Grave	
22	Adult	M	SW	Flexed	Back	Grave	
23	Infant		S			Grave	6 Olivella shell beads, 1 White Mound B/w bowl, 1 Lino Grey jar
24/25	Infant		NE		Back	Grave	
26	Adult	F	S			Grave	
27	Adult	M	SW	Flexed	Back	Slab Lined	
28	Adult	M	SW	Flexed	Back	Grave	3 pottery vessels
F.51	Infant		SW			Grave	

*The fieldnotes indicate that Burial 9 appeared to be a reburial, but this is not apparent from the accompanying drawing.

**Represented by mandible only.

Table 14.
LA 4487 Burial Orientations

N	NE	E	SE	S	SW	W	NW
2	2	1	1	5	8	2	0

pot, and pendants and beads. It was at first felt that grave associations should be divided into utilitarian items and items indicating wealth or status (such as beads or pendants). However, it was not clear to which category some of the pottery vessels should be assigned. Accordingly, only the presence or absence of grave associations was noted. None of the associations present seem to be of the sort which would symbolize structural status positions.

Previous studies of mortuary practices have suggested that burial attributes be arranged in a branching key diagram (Brown 1971; Saxe 1970). For the data from LA 4487 this is done in Fig. 5. This diagram uses only those burials ($n=26$) with sufficiently documented data. The distribution of burials among the resulting classes is shown in Table 15. Strong patterns are evident in this diagram. Log

covered graves are consistently associated with included artifacts, slab lined graves never are. Simple earthen graves may possess or lack associations. Viewing the mortuary ritual represented here as a system for communicating information about the social characteristics of the deceased, it is apparent that the employment of log coverings as a symbol automatically prescribes the presence of grave associations. The presence of slab lining in turn prescribes the lack of associations. For common graves there is no rigid prescription.

In terms of energy expenditure, the burials may be ranked from highest expenditure to lowest as follows: Burial Class I represents the highest degree of energy expenditure, followed by II, III, and IV. Based upon the arguments presented earlier, individuals holding membership in these

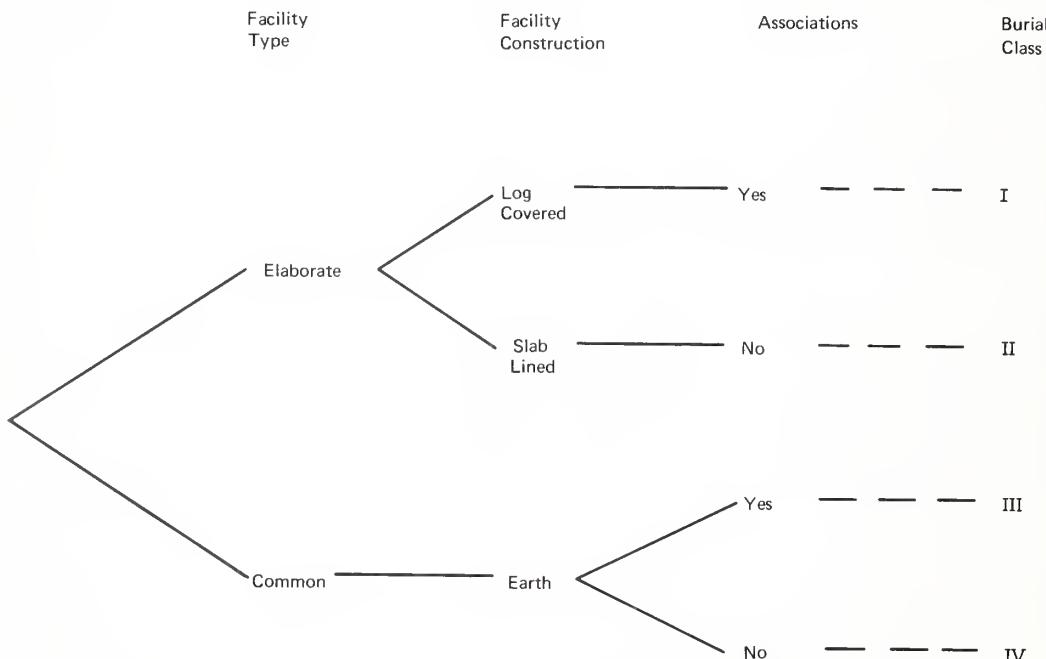


Figure 5. Key Diagram of Mortuary Attributes At LA 4487.

Table 15.
Distribution of Burials By Classes

Class	Burial Numbers
I	2, 3, 4, 16
II	7, 27
III	5, 6c, 8, 10, 12, 20, 23, 28
IV	1, 6a, 6b, 9, 11, 17, 18, 21, 22, 24/25, 26, Feature 51

classes may be interpreted as having been ranked in life in terms of the size and composition of the social aggregate recognizing status responsibilities to them. Of major importance is to determine whether this system of social ranking represents a society with hereditary social classes or a more egalitarian one with achieved ranking.

In Table 16, the distribution of age and sex categories across the burial classes is shown.

Significant patterns are evident in this table. Most noticeable is the fact that only adult members of the society had access to the highest status positions represented in Burial Classes I and II. Apparently, these statuses were of a sort which could be obtained only by personal achievement; subadults were not considered eligible. Burial Class III membership was restricted to adult males and subadults. Only Burial Class IV, the lowest status, was open to all individuals without restrictions.

The restriction of higher status to some of those who had achieved adulthood, the general age/sex restrictions on status positions, the fact that only the lowest status level was open to members of all age and sex categories, and the lack of material insignia of rank, all suggest that this was a relatively egalitarian society, one in which higher status was achieved rather than ascribed. The Late Basketmaker/early Puebloan social organization in this area may be characterized accordingly. Whether egalitarian organization was characteristic of the remainder of the Southwest at this time is unknown.

Burial orientation is a variable that does not appear to partition the data set. In Table 17 the distribution of burial orientations by Burial Class is shown. In each Burial Class the same modal orientation is evident. Similarly, orientation does not associate with age/sex categories (Table 18), or with the presence of associations (Table 19). The factors determining grave orientation cannot be ascertained with the available data.

The clustered spatial aggregation of the burials is a far more significant matter. A sketch map found with the LA 4487 fieldnotes indicates that the burials were found clustered in a formal cemetery. This

suggests the applicability of Saxe's hypothesis, that formal cemeteries reflect the existence of corporately organized social groups. Given the status of this population as sedentary agriculturalists, this interpretation is not surprising. It does, however, have important implications. Adult females were overwhelmingly excluded from the cemetery. Reed's (1962c) skeletal analysis disclosed 11 adult males and only 4 adult females. One of the later was represented by only a mandible. If the presence of a formal cemetery reflects the existence of a corporate group, then in the case of LA 4487, corporate resource ownership was apparently linked predominantly to male members of the society. This suggests inheritance and descent primarily in the male line. Similarly, such a system of land tenure and inheritance could not have worked unless postmarital residence was predominantly with the male's natal group. This pattern, at around 800 A.D., contrasts with possible systems of uxorilocal residence in east-central Arizona, operating by at least 1100 A.D. (Longacre 1970). These inferences concerning residence and descent at Manuelito can be further tested by analysis of the biological characteristics of the skeletal remains (Lane and Sublett 1972).

In summary, the mortuary data from LA 4487 suggest that the late Basketmaker/early Pueblo period near Manuelito, New Mexico was characterized by egalitarian corporate groups practicing patrilineal descent and virilocal postmarital residence.

The Rio Puerco In East-Central Arizona

Archeological investigations along the Rio Puerco in east-central Arizona, while outside the immediate overview area, are pertinent to the present discussion. Major investigations in the area have been reported by Wasley (1960), Gumerman and Skinner (1968), Gumerman (1966), Gumerman and Olson (1968), Wade (1970), and Ferg (1978). The major synthesis has been reported by Gumerman and Olson (1968).

PaleoIndian points have occasionally been found in the area (Danson 1961; Olson 1964), and some Archaic manifestations may be present. But the first definite occupation dates to the Black Creek phase, a local equivalent of Basketmaker II. The

Table 16.
Age/Sex Categories In Burial Classes

Class	N	Subadult	Adult Female	Adult Male
I	4		X	X
II	2		X	X
III	8	X		X
IV	12	X	X	X

Table 17.
Distribution of Burial Orientations By Burial Class

Class	N	NE	E	SE	S	SW	W	NW
I		1			1	2		
II						1		
III			1		2	1	1	
IV	2	1		1	2	4	1	

Table 18.
Distribution Of Burial Orientation By Age/Sex Categories

Category	N	NE	E	SE	S	SW	W	NW
Subadult	2			1	1	2	1	
Adult Female		1			1	1		
Adult Male		1	1		2	5	1	

Table 19.
Distribution Of Burial Orientation By Grave Associations

Assoc.	N	NE	E	SE	S	SW	W	NW
Present		1	1		3	3	1	
Absent	1	1		1	2	5	1	

succeeding Lupton and La Plata phases (partly contemporaneous phases) date to the Basketmaker III period. Some sites of this time period contain Lino Grey and La Plata B/g, suggesting northern interaction, but others in the Rio Puerco Valley show Mogollon brownwares. After the Lupton phase the ceramic borders shifted farther south.

The White Mound phase (750-850 A.D.), as in the Red Mesa Valley, shows pithouses with surface storage rooms. In the Kiatuthlanna phase (Pueblo I) pithouse architecture with surface granaries continued to be employed. The Red Mesa phase (10th century) reveals a shift to above ground dwellings with associated kivas. Pithouses continued to be used. In the Houck phase (late 11th century to mid 1200s), the average number of rooms in pueblos doubled to 20-25. Small, masonry-lined, rectangular pithouses continued to be used. In this phase, intrusive pottery was more frequent, suggesting increased trade. The Kintiel phase (1250 to ca. 1300) represents the terminal occupation of the area. Populations aggregated, the number of sites decreased, and the size of sites increased. Centralized pueblos with satellite structures were built, along with Great Kivas and dance plazas.

The Rio Puerco of eastern Arizona, immediately across the New Mexico border, is one of the Anasazi/Mogollon transition zones where Mogollon intrusions have frequently been postulated. Wasley (1960) suggests that the Lupton phase displays Mogollon characteristics, while Gumerman and Skinner describe the area as an "Anasazi-Mogollon amalgam" (1965:197). Ferg (1978) has recently suggested Mogollon migration into the area during the White Mound phase, and believes that Mogollon and Anasazi populations coexisted in the area.

I have suggested in this overview that attempts to explain cultural change by reference to migration, which are so common in Southwestern archeology, can only be validated by demonstrating biological replacement of the human population. In the Rio Puerco area, Wade (1970) has conducted a study oriented in part toward this problem. The results have broader implications concerning this mode of interpretation.

Wade's study dealt with the skeletal remains of 171 individuals recovered during highway salvage excavations. The remains spanned the period from 750 to 1250/1300 A.D. Wade (1970:4) divides this interval into four temporal periods. These periods, and the sample size in each, are shown in Table 20. Wade cites Thomas Lee's (1966) excavations in the adjacent southeastern portion of the Navajo Reservation as suggesting that the Houck skeletal samples do reflect relative population changes. Lee, for example, documents tremendous population increase between 950 and 1100, with a noticeable peak around 1000 A.D. The Houck skeletal series matches this pattern precisely (Wade 1970:12-13).

The demographic information revealed by Wade's study is significant. There was a high infant mortality rate, which Wade attributes to chronic anemia. Nearly half of all individuals died before reaching reproducing age, while 60.2 percent of those attaining reproductive age (18) died before ending it (35). So to maintain population levels, females had to average at least six births apiece. During periods of population growth, more births would have been required. As a consequence, the majority of persons dying between 18 and 35 years were females, while the mean age at death for males was seven years greater than for females. Wade notes an increase

Table 20.
Temporal Placement Of Rio Puerco Skeletal Series

Period	Dates	Phases	N
I	750-850	White Mound (Basketmaker III)	17
II	850-1000	Kiatuthlanna (PI) and Red Mesa (Early PII)	19
III	1000-1150	Wingate (late PII) and early Houck (early PIII)	96
IV	1150-1250	Late Houck (late PIII)	39

through time in death rates of the young, particularly infants, and suggests that the population decline after 1000 A.D. was due to an excess of infant mortality. It may be expected that similar processes were occurring across the state border, in the Mt. Taylor overview area.

Most importantly for our present purposes, Wade conducted a comparative study of Puerco skeletal morphology using both metric and non-metric attributes. Both types of attributes indicated that the Puerco samples had closer biological affinity to Anasazi Pecos than to Mogollon Point of Pines. Significantly, the Puerco series was genetically homogeneous between 750 and 1250 A.D. There is no evidence indicating Mogollon (or other) intrusions into the area. To the contrary, the data strongly indicate that the Puerco region, despite displaying frequent Mogollon characteristics, did not experience any population incursions. Indeed, there is even some evidence for Anasazi biological influence in the Mogollon area after 1000 A.D. (Wade 1970:55, 66, 101, 124, 172-177).

Wade's study has significant implications. If the Puerco area can display fluctuations between Mogollon and Anasazi characteristics without experiencing actual population migration, then so of course can other areas. Thus, in areas where alternations between Mogollon and Anasazi characteristics have been interpreted as reflecting population incursions, these interpretations are called into question. The implications for the Zuni, Acoma, and West Mesa portions of the overview area are obvious.

Manuelito Canyon

The most recent large-scale research synthesis of a portion of the study area has been compiled by Weaver (1978), based upon survey in Manuelito Canyon. Weaver set out to test the hypothesis that, if a densely populated area is surrounded by areas of lower density and of similar or greater economic potential, mass migration will tend to occur when a critical resource is no longer sufficient. From this primary hypothesis, Weaver derives a secondary proposition: that Manuelito Canyon came to be abandoned when population exceeded the

area's agricultural potential. A further series of seven tertiary hypotheses were derived, but these are not of concern for this overview.

On an a priori basis, problems are apparent in Weaver's primary and secondary hypotheses. It is difficult to conceive of how adjacent areas of equivalent economic potential, in pre-state societies, could have disproportionate population densities. As population grows in one area, migration to less densely settled areas would be preferable to the labor intensification (deterioration in effort/return ratio) which would be necessary otherwise. Examples of shifting agriculturalists are common in the ethnographic literature. Secondly, if an area comes to be overpopulated, the most reasonable (least cost) solution would seem to be for part of the group to leave and part to remain. Weaver's hypotheses cannot account for why this did not happen in Manuelito Canyon. Thus, although Weaver's hypotheses purport to explain abandonment, they do not really do so.

Weaver derives a cultural/temporal sequence for Manuelito Canyon based upon previous archeological research in surrounding areas. Eleven temporal periods have been defined.

PaleoIndian (?-2500 B.C.): Only projectile points from this era have been found in the region. Weaver's date of 2500 B.C. for the PaleoIndian/Archaic transition is probably much too recent.

Early Archaic (2500 B.C.-1 A.D.): Pinto Basin type points have been found on Black Creek about 10 miles west of Manuelito Canyon. Sites near Sanders, Arizona, had five shallow, basin-shaped pithouses with irregular oval outlines and undercut interior storage pits.

Black Creek (1-500 A.D.): Characteristics of this phase include shallow-basin pithouses, outdoor hearths, and bell-shaped roasting pits. One pithouse had kiva-like features.

Lupton/La Plata (300-700/750 A.D.): Characteristic features include circular to rectangular pithouses and brownware ceramics which are similar to Mogollon wares.

White Mound (700-800/950 A.D.): Rectangular to circular pithouses, over one meter deep and up to eight meters in diameter, continued to be made. Pottery types include Lino Grey, White Mound B/w, and some brownwares.

Kiatuthlanna (800-900 A.D.): Pithouses concentrated in the uplands above the valley floodplains. Surface granaries with subsurface storage pits were built. Kana'a B/w was abundant, associated with Kiatuthlanna B/w and a neck-banded greyware.

Red Mesa (900-1000 A.D.): Deep pithouses continued to be made, but surface rooms of crude stone and adobe construction were also used. Masonry kivas were employed.

Wingate (975-1050 A.D.): During this phase contiguous rooms of block masonry were built. One or more kivas were placed in plazas. Structures usually consisted of less than 10 rooms, built in L or U shapes. Some small pithouses continued to be used.

Houck (1050-1250 A.D.): Structures consisted of 20 to 25 contiguous rooms with multiple, keyhole-shaped kivas. Small, masonry-lined, rectangular pithouses were also used.

Kintiel (1250-1325 A.D.): Large sites with kivas in room blocks were built. Great Kivas and dance plazas were constructed. Smaller satellite pueblos were located near the larger sites.

1325 to Historic Era: Manuelito Canyon was virtually abandoned after 1325. It was visited on occasion by small groups of Zuni and Acoma, and has been occupied in the historic period by Navajo.

Weaver (1978:66-67) presents a brief paleoclimatic synthesis. The period between 500 and 1000 A.D. witnessed climatic conditions similar to today's in Manuelito Canyon. Prior to 700 several periods of wetter conditions occurred. The interval between 1000 and 1100 was also wetter than present. From about 1100/1125 to modern times there has been a gradual drying trend, interrupted by some very dry periods (e.g., 1275-1375 A.D.).

Weaver attempts to reconstruct demographic trends in the canyon through analysis of

ceramic time periods, site size, and number of habitation units occupied per 50 year period. He estimates this last characteristic by developing regression equations which predict number of habitation units from site size. The results indicate gradual growth of population through time. Most interesting, though, is an apparent hiatus between 800 and 1000 A.D., when few sites are apparent, and especially between 850 and 950 when there are no documented sites. Weaver suggests that this does not reflect actual abandonment, but only a flaw in the ceramic chronology, since when ceramic frequency histograms were constructed for individual sites, many showed peaks on both sides of the 850 to 950 period. Weaver dates sites on the assumption that ceramic frequency follows a normal curve through time (1978:147).

Noting that there is no evidence for conflict as a reason for the abandonment of Manuelito Canyon, Weaver turns to the possibility of agricultural overpopulation. Using an ethnographically-derived estimate of 1.7 persons per pueblo room, he calculates estimates for the population occupying the area, for this population's food requirements, and for agricultural potential. Based upon these calculations, he suggests that if the canyon bottomlands were used exclusively for agriculture, by 1250 A.D. the food requirement exceeded the crop potential by 6.5 to 37 percent. If the mesas and flanking ridges were used (which he feels is unlikely), and even unsuitable land cultivated, food requirements would still have exceeded agricultural capacity. Based upon this, he concluded that his hypotheses were verified by the data: abandonment occurred because a critical resource, agricultural land, was not sufficient to sustain the population (Weaver 1978:302-309).

Under critical scrutiny, Weaver's claims for the success of his hypotheses may not bear up. One flaw in his conclusion is that mass abandonment did not occur when he predicts it should have. Agricultural capacity was, as Weaver demonstrates, exceeded by 1250 A.D., yet the area was not abandoned until around 1325. If Weaver's hypotheses were valid, the area should have been massively abandoned shortly after 1250. The 75 year lag is not explained by his propositions, particularly when the period involved (the Kintiel phase, 1250-

1325) displays evidence of increased socio-cultural complexity.

Weaver (1978:309-315) provides a concise synthesis of the prehistoric occupation of Manuelito Canyon. Sometime prior to A.D. 1 groups of hunters and gatherers came to use the canyon on a seasonal basis. Nearby populations came to practice a sedentary agricultural existence, settling in favorable locations such as the Rio Puerco. Early agricultural sites of this sort have not been found in Manuelito Canyon. Shortly after 500 A.D. the first permanent settlements were occupied in the canyon. These were small and scattered. Pottery was introduced into the area between 500 to 700 A.D. By 700, population had increased and had nucleated into several fairly large villages. Rapid population increase occurred after 800, leading to overpopulation, resource depletion, and ultimate abandonment. Weaver suggests that the consequences of overpopulation -- disease, starvation, and so forth -- may have caused population to drop prior to abandonment. (It should be noted that this may contradict his conclusion that overpopulation forced abandonment, for if population decreased, overpopulation might have no longer been a problem. Weaver counters this possibility by suggesting environmental degradation during the period of overpopulation.) Perhaps recognizing that his hypotheses do not really explain abandonment, Weaver reverts to ad hoc modifications of his original ideas. He suggests that the reduced population abandoned the area, rather than split into remaining and emigrant groups, because of negative feelings concerning the now-degraded canyon and because of a wish to maintain the established social order (Weaver 1978: 314-315).

Chacoan Outliers

The Northwestern Subarea contains the largest number of Chacoan outliers of any portion of the overview area. Those documented to date include the following:

- Andrews
- Casamero
- Coolidge
- Coyotes Sing Here
- Fort Wingate
- Haystack.

Descriptions of these are provided by Marshall and others (1979).

THE SOUTHWESTERN SUBAREA

The southwestern portion of the overview area includes a portion of the historic Zuni territory but, due to the arbitrary overview boundary (the state line), does not include the total range of Zuni occupation (Ferguson 1979). Nevertheless, the segment of Zuni territory included in the overview seems to display a pattern of prehistoric occupation which is intelligible by itself, even if poorly known.

The Zuni area has witnessed some of the earliest archeological work in the Southwest (e.g., Fewkes 1891; Mindeleff 1891; Kroeber 1916a, 1916b; Spier 1917), and participated in methodological advances which have come to be of enduring utility throughout the United States (Kroeber 1916b, Spier 1917). It has also been the scene of some of the classic studies of Southwestern archeology (Roberts 1931, 1932, 1939, 1940). Despite this, the prehistory of the southwestern subarea is known in only the sketchiest detail. The ongoing work of the Zuni Archeology Program (which is currently preparing a cultural resources overview for the reservation) will no doubt remedy this situation in the near future.

In addition to the comparative lack of substantive research in this area, Zuni archeology is difficult to synthesize because recent investigators have proliferated new cultural/temporal sequences for the region (Marshall n.d.a; Dodge, Pearson, and Ferguson 1977). This has been done because of confusion concerning the applicability of earlier classifications to the area. However, the criteria used in the development of these new sequences have not been systematically presented. As a result, a synthesis of the prehistory of the Zuni area cannot be so detailed as that achieved in, for example, the Acoma area. For the purposes of this review I will use the most recent classification, that presented by Dodge, Pearson, and Ferguson (1977), with references to the Pecos Classification, and with incorporation of information from Marshall's (n.d.a) synthesis.

Prehistory Of The Eastern Zuni Area

The general pattern of moisture fluctuations for the area has been recently summarized by Wiseman (1977:18), as follows:

A.D. 710-890: relatively stable with numerous, mild fluctuations;

890-1000: severe climatic oscillations;

1000-1080: less frequent (lower periodicity) oscillations;

1080-1300: Pattern of regular, moderate oscillations until Great Drought (1276-1299);

1300-1340: cooler and moister;

1340-1610: warmer and drier, with period terminated by a severe drought which peaked about 1585;

1610-1725: cooler and moister, except for the period 1660-1685;

1735-1830: generally warmer and drier with more frequent oscillations;

1830-1950: cooler and moister.

PaleoIndian and Archaic occupation of the eastern Zuni area is not well documented. Only isolated projectile points have been found. Nevertheless, as noted previously, the degree of erosion in the Zuni Reservation suggests that it is an appropriate area to look for the remains of early hunters and gatherers (cf. Cordell 1979: 133-134).

In the Zuni Early Formative (Basketmaker III through early Pueblo II) pithouse villages came gradually to be replaced by above-ground masonry structures, a pattern seen throughout the overview area. The settlement pattern of this period suggests the use of multiple resource zones. Sites have been found at high elevations near secondary drainages, and at lower elevations along major drainages. Few have been found east of Zuni Pueblo because of a preference for lower elevations along the western margin of the Zuni Plateau (Marshall n.d.a). The ceramic assemblage included Lino Grey, Kana'a B/w, Kiatuthlanna B/w, White Mound B/w, and

Forestdale Smudged. No redwares have been observed. Marshall (n.d.a) suggests that this ceramic assemblage reflects clear Anasazi affiliation, since the Mogollon Forestdale Smudged is common in Anasazi sites of this period (Dodge, Pearson, and Ferguson 1977:29; Marshall n.d.a). The archeological characteristics of this period are often suggested to reflect Chacoan relationships (e.g., Reed 1955:179; Rinaldo 1964), although the sociocultural implications of this assessment have not been evaluated. Wasley (1960:32-34) believes that Mogollon "colonies" existed throughout the Zuni-Gallup area during the Early Formative. As described in the preceding section, Wade's (1970) osteological analysis has made this interpretation unlikely.

In the Yellowhouse area, Fosberg notes that population pressure during Pueblo I forced settlement expansion by Pueblo II into areas with poor soil and water conditions. Between Pueblo II and Pueblo III settlements shifted from clay to sandy soils, possibly due to salt build-up and deteriorating soil structure (Fosberg 1978: 212-216).

The Middle Formative period (later Pueblo II to early Pueblo III) witnessed a settlement shift to nearly exclusive occupation along the major drainages of the area, where broad expanses of arable bottomland were available (Zier 1975a:113). Settlements were scattered about the western margin of the Zuni Plateau. There was, however, some expansion into the Zuni Valley proper west of Pescado Village. Multi-storied pueblo constructions began, with some architectural attributes (rectangular kivas) suggesting Mogollon affiliations. Redware ceramics, in particular the White Mountain Red Ware series, were introduced.

Middle Formative site density along or near major drainages was substantial. Dodge, Pearson, and Ferguson (1977:31) suggest that fairly large irrigation projects may have begun during this period, but firm evidence of this occurs only in the next phase. A Chacoan outlier, the Village of the Great Kivas (Roberts 1932) was built on upper Nutria Creek, possibly during this period. Roberts (1932:169) places the Chacoan occupation of this site between 1000 and 1030, while Powers (n.d.) suggests

use from the mid-1000s to the middle or late 1200s. It is one of only two Chacoan sites in the eastern Zuni area.

The Late Formative (later Pueblo III and Pueblo IV) displays an increase in socio-economic complexity. This is indicated by both increased site size and by the development of Zuni cultural identity, which Dodge, Pearson, and Ferguson (1977:31) feel is expressed in the development of glaze-ware ceramics. The total number of sites decreased as populations aggregated into large towns.

During this period there were substantial population movements toward higher elevations in the east. This development will be discussed in more detail in the following section. Toward the end of the phase, settlements shifted back to the south and west as populations abandoned the Nutria, Pescado, and upper Zuni drainages. During this latter time along the middle and lower Zuni River, the Cities of Cibola and other sites were settled (Ferguson 1979).

Continuing in this period the region exhibits Mogollon affiliations, particularly with the Little Colorado region. It is not surprising, then, that Zuni skeletal samples suggest close genetic connections with this area (Taylor 1976). Rinaldo (1964) characterizes later Zuni populations as largely Mogollon.

The period leading up to the Coronado Expedition has been summarized by Ferguson (1979). By 1450 the Zuni were living in the six large, aggregated Cities of Cibola, along a 15 mile stretch of the upper Zuni River valley. The early occupations at these locations are associated with red slipped Heshotauthla Polychrome, red and white slipped Kwakina polychrome, three white slipped varieties of Kwakina Polychrome, Pinnawa Glaze-on-white, Pinnawa Red-on-white, and red slipped Gila Polychrome. The later occupation of the six villages is marked by a change in ceramics to Matsaki Brown-on-buff and Polychrome.

The Ramah-El Morro Area

Research in the Ramah-El Morro area began with the work of Spier (1917), followed in the early 1950s by Richard Woodbury's excavations at the site of Atsinna, on top

of Inscription Morro Rock (see Fig. 6) (Woodbury 1954a, 1954b, 1954c, 1955, 1956, 1970; Woodbury and Woodbury 1956). In the early 1970s Patty Jo Watson, Steven LeBlanc, and Charles Redman conducted extensive work in the area (Watson, LeBlanc, and Redman n.d.; LeBlanc 1975, 1976, 1978; Redman 1977, 1978; Pearsall 1973; Marquardt 1974; McGarry 1975; Rubertone 1973; Kintigh 1979). Most recently, the National Park Service has conducted an inventory survey of El Morro National Monument under the direction of Bruce Anderson.

Watson, LeBlanc, and Redman (n.d.) surveyed 25 percent of the 50 square mile El Morro Valley. A total of 200 sites were located, of which 50 percent displayed masonry. Two periods of occupation are known from the area. Around 900 or 1000 A.D., a small population built a few pithouses along the upper valley margins in the pinyon-juniper zone. These sites exhibit Cibola white-wares, but lack redwares.

Following this early occupation, there was a hiatus until the mid-1200s when substantial Zuni populations moved to higher elevations in the area. The factor instigating this movement was the climatic deterioration during the latter half of the thirteenth century. This forced populations to shift to higher elevations where greater moisture was available. This movement was apparently rapid, with the population rising from zero to over 3000 in only one or two decades (LeBlanc 1978:48).

The initial settlement in the thirteenth century has been termed the Scribe S phase (Watson, LeBlanc, and Redman n.d.). LeBlanc (1978:48) dates this phase to the period between 1250 and 1275 A.D. Most of the settlements of this phase were apparently built in the 1260s. At least seven settlements were established in this period, with each settlement consisting of from 7 to 20 small pueblos which total up to 200 or 300 rooms in aggregate. Each pueblo of 5 to 20 rooms is located within 1000 meters of its nearest neighbor. These sites are located on mesas or promontories, in defensible topographic locations. LeBlanc (1978:48), however, suggests that most were not situated for defensive purposes.

Shortly after the Scribe S phase settlements were constructed, they began to be abandoned. Beginning around 1276, a major



Figure 6. Atsinna Pueblo On Top Of Inscription Rock.

change in settlement pattern began which was completed within ten years. During this interval seven large (500 or more rooms) pueblos were built, each located near a cluster of smaller, Scribe S phase sites. The results of ceramic studies by Kintigh (1979:54) suggest that at each location where this occurred there was social group continuity: the same population which abandoned the smaller sites aggregated into the larger ones. The period of these aggregated communities is called the Muerto phase (1275-1300) after Pueblo de los Muertos, a large site where extensive excavations were conducted. Atsinna Pueblo, on top of El Morro Rock, is one such site. A total of 3000 rooms are present in the Muerto phase sites, of which 2500 may have been in use at one time. The population reflected in these sites may have ranged between 2350 and 5000 persons.

Pueblo de los Muertos was systematically and rapidly built. It displays highly standardized construction. The site contains a total of about 740 rooms, of which a maximum of 600 were occupied at one time. The sites of the Muertos phase were frequently built of stone robbed from the earlier pueblos.

The Muerto phase pueblos do seem to have been built for defense (LeBlanc 1978:48). They are situated close to water supplies and were two stories high in the outside tier of rooms. The fact that some of the earlier pueblos were burned (LeBlanc 1978:48) lends credence to the interpretation that the later ones were situated and built for defense.

By the early 1300s climatic amelioration had reduced the growing season to the extent that the Muerto phase settlements were abandoned, and the population shifted downstream to the lower elevations of the Zuni River (Watson, LeBlanc, and Redman n.d.; LeBlanc 1978). Woodbury (1956:561) suggests that the abandonment of Atsinna was gradual, with rooms emptied of useful objects and filled with trash. Similar processes of settlement, aggregation, abandonment, and downstream movement occurred further west in the Zuni Reservation along the upper Pescado (Marshall 1974).

Watson, LeBlanc, and Redman (n.d.) propose that the defensive preparations apparently undertaken by the population of the El Morro Valley reflect conflict within the

valley, not threats from outside. They relate this phenomenon to the drought conditions occurring at the time, and suggest competition for land and water. This interpretation may be questioned, though, as Pearsall (1973) has shown that Muerto phase sites had populations well below the agricultural capacity of their lands. Whatever the reasons for this aggregation, it has remained the dominant characteristic of Zuni settlement since the Muerto phase.

The ceramics of the El Morro Valley are undergoing study from a number of perspectives. Marquardt (1974) and LeBlanc (1975, 1976) have conducted seriation studies, while Redman (1978) and Kintigh (1979) have focused, at least in part, on social networks of design transmission. Redman (1978:185) notes more standardization of design at later sites, and suggests two alternative explanations: 1) production by craft specialists, or 2) increased social interaction. Available data do not support the first possibility. LeBlanc (1976:76) has suggested that time sensitive ceramic attributes in the area include 1) the proportions of St. Johns and Heshota Polychromes, 2) the proportions of black paint ceramics that were either glaze, subglaze, or matte, 3) the proportion of redwares with a Munsell hue of 10R, and 4) the mean width of exterior white lines on St. Johns and Heshota Polychrome bowls. LeBlanc makes the significant observation that, of sherds belonging to the St. Johns and Heshota Polychrome categories, 62.5 percent could not be definitely assigned to either type.

Social Evolution In The Eastern Zuni Area

The recent archeological survey of the Yellowhouse Dam area, at the confluence of the Rio Nutria and the Rio Pescado, has provided Hunter-Anderson (1978) the opportunity to develop a model accounting for changes in social organization in the Zuni area. This model has widespread applicability.

Hunter-Anderson's working proposition is that cultural evolution in the area was conditioned by long-term competitive strategies in an uncertain environment, and that this uncertainty led to a tendency toward increased incorporation of social units through time. Incorporation refers

to the scale of the population aggregate organized as a social entity (e.g., lineage, clan, ethnic group, nation).

The key variables in this pattern are a set of environmental conditions (such as variations in rainfall and frost) generating uncertainty in where, and in what quantities, horticultural products can be obtained (for ethnographic examples of this phenomenon, see Ford [1972]). Incorporation provides a solution to the problem of localized production uncertainty, since access can be gained to resources from a wider geographical area. Hence, the strategy of increased social incorporation is actually a strategy for buffering localized productivity fluctuations by increasing the geographical scale of the production and consumption unit.

Hunter-Anderson sees a pattern of evolution from lineage to clan to ethnic levels of incorporation. She suggests that use of mechanisms for inclusion and exclusion, such as lineages, were for the purpose of maintaining both land tenure and social affiliations. However, due to the settlement shifts so characteristic of Southwestern prehistory, related lineages would inevitably become dispersed, and so non-localized descent groups (clans) developed to maintain incorporation. The ethnic level of incorporation provides an even more inclusive means of organizing widespread populations. Hunter-Anderson suggests that when all of these levels are in operation, a person is more fully "insured" against local productivity fluctuations (1978:22-24).

Turning to the Chacoan phenomenon, represented in the eastern Zuni area at Village of the Great Kivas (Roberts 1932), in a road segment in the Yellowhouse Dam area (Hunter-Anderson 1978:87), and possibly at one other site on the upper Pescado (Marshall 1974:15), Hunter-Anderson suggests that with the decline in use of Great Kivas, different modes of social integration, such as community-based organization and ethnicity, came into play. She proposes that the Chacoan road network was used to transmit food supply information, for transport of food, and for travel by persons attending ceremonials at distant locations. In turn, the Chaco social system, Hunter-Anderson suggests, failed to develop the hierarchical levels needed to process the large amounts of information

required by such a system, and so the Chacoan phenomenon collapsed (1978:86-88). However, it appears that Hunter-Anderson has overlooked the abundant evidence that hierarchical levels did develop in the Chacoan system, witnessed by extensive public works projects (cf. Allan and others 1976).

Western Pueblo Culture In The Zuni Area

The changing character of the Zuni archeological record, from Chacoan Anasazi to Mogollon Western Pueblo, has been commented upon several times (Reed 1946, 1948, 1950; Johnson 1965). Zier (1975a:122-123) notes that population increase in the Zuni Valley in the thirteenth century may have partially resulted from abandonment of the Rio Puerco and northern Mogollon areas, both of which he feels were abandoned by 1250 A.D.

Zuni and Acoma, along with the Hopi Pueblos, are generally acknowledged as the descendants of the prehistoric entity known as the Western Pueblo Archeological Complex (Reed 1948) or as Western Pueblo Culture (Johnson 1965). Johnson places the development of Western Pueblo Culture in the mountains of west-central New Mexico and east-central Arizona around 1000 A.D. Its universal features include plaza or multiple court layout, rectangular small kivas, brownware pottery, extended inhumations, the 3/4 grooved ax, and turkey hunting rather than keeping. Johnson believes Western Pueblo Culture is a blend of Mogollon, Anasazi, and Hohokam features (1965:14-16).

Although the point has been made elsewhere in this chapter, it is worth repeating that attempts to derive sociocultural entities ("cultures") from trait distributions are fraught with ambiguities. As noted, such attempts depend upon the assumption that the archeological traits involved functioned, either explicitly or implicitly, as symbols of group identity. Yet ethnographically the ways in which ethnic groups manipulate such symbols do not pattern in the neat ways that archeologists assume (cf. Barth 1969). Furthermore, archeologists have not shown much power to discriminate those characteristics of the archeological record which may indeed have functioned as identity markers. Thus, in the present case, it is

at least dubious to suggest that, in Western Pueblo Culture, turkey hunting, rather than keeping, was a means of expressing cultural identity. To postulate the existence of a cultural entity based upon such traits makes for a highly questionable reconstruction.

As suggested earlier in this chapter, it may prove profitable to view such trait distributions in terms of social interaction and trade, rather than solely in terms of cultural entities. The early Zuni affiliation (focus of interaction) was with populations to the north, populations displaying Chacoan characteristics. The purpose of this interaction may have been participation in the regional social and economic entity that has been termed the Chacoan Interaction Sphere (Altschul 1978). Such participation is indicated by the presence of Chacoan sites and roads on Rio Nutria and Rio Pescado. By perhaps 1000 A.D., interaction with populations to the southwest resulted in Anasazi bio-

logical influence on local Mogollon populations (Wade 1970). Since there was no corresponding Mogollon biological influence in the Anasazi Rio Puerco area (Wade 1970), it would appear that actual movement of Anasazi population segments to the south occurred. The resulting cultural changes led toward what is called Western Pueblo Culture (Johnson 1965:45).

With the demise of the Chacoan system and the subsequent abandonment of the San Juan Basin, the focus of Zuni interaction shifted toward the large population centers along the Little Colorado. Interaction with this area would have ultimately led to kinship linkages, with such affinity expressed and reinforced through the adoption of selected southwestern symbols (such as square kivas). In this manner, interaction and trade, leading ultimately to kinship linkages and the adoption of new symbols to reinforce affinity, can lead to an archeological record which appears to reflect a widespread cultural entity.

1. In a recent study, John Wood (1978) developed a model of settlement location strategies based upon the principles of economic optimization. Application of the model involves multivariate quantitative analysis. When applied to Judge's Folsom data, Wood found that the results substantially confirmed Judge's earlier conclusions.

Part of Wood's model involves the computation of an index of site diversity. This index is actually an information function, computed on relative proportions of different artifact classes per site. However, Wood's assumption that artifact diversity is equivalent to activity diversity is questionable, particularly as he computes diversity in this case. Since different kinds (or duration) of activities will result in differing loss/breakage rates of artifacts, variations in artifact proportions may reflect not only diversity of activities, but also kinds of activities and variations in the duration of these.

2. George Agogino (personal communication) believes that the PaleoIndian remains he described near Grants (Agogino 1957a) represent a post-Cody Angostura occupation.
3. Marshall and others have recently suggested (1979:218) that this "Great Kiva" is actually a plaza.

PREHISTORY: SYNTHESIS

THE REGIONAL CHRONOLOGIES

To ensure clarity in the synthesis to follow, Tables 21 and 22 provide a synopsis of the cultural/temporal sequences which have been developed in the overview area. It should be kept in mind that these sequences are not the only ones, nor are they universally accepted. I have selected only one agriculturalist sequence for each subarea, and since only one detailed Archaic sequence has been developed in the overview area, this has been presented with the acknowledged possibility that it may not prove to be equally useful everywhere. For later periods, I have selected for presentation those chronologies which, in my opinion, are the most recent, or most complete, or most widely accepted.

EARLY HUNTERS AND GATHERERS

Archeologists who have studied the PaleoIndian phenomenon in west-central New Mexico are largely in agreement concerning early subsistence practices. Although Judge (n.d.) and Irwin-Williams (n.d.a) offer differing interpretations of the degree of diversity in Clovis subsistence, both feel that by Folsom times a focal economy, specialized on bison hunting, had emerged. Continued specialization on bison is believed to have charac-

terized PaleoIndian economies until the termination of this era, although Irwin-Williams (1977b) believes that west-central New Mexico was largely abandoned between Folsom and Cody times, with populations withdrawing to the Plains to continue megafaunal exploitation. She attributes this to a period of lower moisture which reduced opportunities for hunting megafauna in and around the overview area. Judge, in contrast, has documented the presence of a megafauna-hunting population in the Middle Rio Grande Valley, which he places temporally between Folsom and Cody.

There are two points at issue here. The first concerns the extent to which PaleoIndian populations did indeed concentrate overwhelmingly on megafauna. The second deals with the postulated withdrawal of Plains-based hunting populations from the area between Folsom and Cody, and between Cody and the Archaic.

Viewed on an a priori basis, it is unknown for hunters and gatherers outside of the Arctic to concentrate on a single faunal resource. This would have especially been the case in topographically diverse western New Mexico, where the availability of horizontally compressed resource zones would have provided the opportunity to exploit diverse resources with minimal travel and transport costs. This factor

Table 21.
Early Hunter-Gatherer Sequence

Cultural/Temporal Period	Temporal Range
En Medio (Basketmaker II)	800 B.C. - 400 A.D.*
Armijo	1800 - 800 B.C.
San Jose	3200 - 1800 B.C.
Bajada	4800 - 3200 B.C.
Jay	5500 - 4800 B.C.
Cody	6600 - 6000 (?) B.C.
Belen	ca. 8000 (?) - ca. 7000 (?) B.C.
Folsom	8800 - 8300 B.C.
Clovis	9500 - 9000 B.C.

*The late Archaic/early Basketmaker period is often given various phase names in different areas.

Table 22. Agriculturalist Sequences

	EASTERN SUBAREA	SOUTH - CENTRAL SUBAREA	NORTH - CENTRAL SUBAREA	NORTHWESTERN SUBAREA	SOUTHWESTERN SUBAREA	PECOS CLASSIFICATION
1600 A.D.		Acoma				
1500	Cubero					
1400					Pueblo IV	
1300	Mesa Verde	Kowina			Late Formative	
1200	Late Chaco D		Ceramic 7			
	Early Chaco D	Pilares		Houck		Pueblo III
1100	Late Chaco C		Ceramic 6			
	Chaco C	Cebolleta		Wingate		Middle Formative
1000	Early Chaco C		Ceramic 5			
	B/C Transition			Red Mesa		Pueblo II
900	Chaco B		Ceramic 4	Kiatuthlanna		
		Red Mesa				
800	Late Chaco A	Kiatuthlanna	Ceramic 3	White Mound		Pueblo I
		White Mound				
700	Chaco A					
600	Trujillo/Early Chaco A					
500					Lupton/La Plata	
400 A.D.						Basketmaker III

*Weaver's (1979) sequence is presented here, rather than Gladwin's (1945), because it contains more recent data, and because Gladwin's has generated so much controversy.

**Dates after Marshall and other (1979:257).

alone suggests that PaleoIndians would likely have used a broader array of floral and faunal resources. More to the point, data from Judge's survey seem to contradict the interpretation of a focal economy. Even if Judge has located only a small portion of all megafaunal kills in the Middle Rio Grande Valley, the evidence recovered strongly suggests that megafauna could have accounted for only a fraction of the diet. Available evidence indicates that a focal economy could not have been maintained.

This point has bearing upon the second question, withdrawal to the Plains. If PaleoIndian populations in west-central New Mexico were indeed utilizing resources other than megafauna, then during periods of megafaunal depletion movement to the Plains would have been unnecessary. Since megafauna, in any event, can have been no more than a small fraction of the diet of local PaleoIndians, then any decrease in their availability could have been easily adjusted for. Similar arguments apply to the PaleoIndian to Archaic transition. Furthermore, there are logical problems with the interpretation that Plains-based hunting populations expanded into, and withdrew from, west-central New Mexico, depending upon the supply of megafauna. If Plains megafaunal resources were of sufficient magnitude, then expansion to the west would have been unnecessary. If Plains resources were insufficient, then encroachment by groups withdrawing from the west during periods of scarcity would have been resisted. Judge's view, that Belen complex materials have not been documented outside the Central Rio Grande Valley (1973:69-72) argues against the population movements which Irwin-Williams (1977b) postulates.

A major problem in PaleoIndian research is why evidence of a more diversified subsistence base hasn't been found. The most likely answer is that diagnostic implements, the specialized projectile points used to hunt megafauna, may not have been used in other subsistence pursuits. Two archeological impressions would result from this, that PaleoIndians did not practice a diversified economy, and that the area was uninhabited during periods of megafaunal depletion. The development of criteria for recognizing other types of PaleoIndian settlements is crucial.

Although the PaleoIndians of west-central New Mexico occupied a topographically diverse environment, it is not likely that this condition led to sedentism and population growth. The southward depression of climate and life zones in the immediate post-Pleistocene would have prevented this. However, with gradual climatic amelioration and the northward migration of life zones, both longer growing seasons and new kinds of environments entered west-central New Mexico. These new environments were characterized by higher productivity/biomass ratios, and were thus more suitable for supporting higher tropic levels of consumers, including the human species. Local human populations, recognizable in the archeological record as the Archaic, responded to the new opportunities in predictable ways.

The earliest Archaic settlements in the Arroyo Cuervo region were apparently situated to maximize diversity. These sites were located in sheet sand deposits at canyon heads where several productive zones (canyon rims, canyon bottoms, springs) come into proximity (Irwin-Williams 1973). Selection for occupation at these locations would have provided access to a diverse resource base with only a minimum of mobility. There was correspondingly a high degree of sedentism in the Arroyo Cuervo early Archaic populations. Irwin-Williams (1973) suggests that during the Jay phase, the full range of seasonal activities is represented in these sites, and that year-round exploitation of seasonally diversified resources took place from these locations. Seasonal, special-use sites have been found in a variety of locations.

This pattern of settlement continued through the succeeding Bajada and San Jose phases. This degree of sedentism apparently set the stage for growth of population, a trend which Irwin-Williams (1973) notes throughout the Archaic. There are indications that the Arroyo Cuervo region may not have been the only portion of the Southwest undergoing population growth during this period. Although the available data are, of course, spotty, nevertheless evidence is accumulating that Archaic populations were consistently attempting to minimize their subsistence costs by settling in locations of high ecological diversity. This has been pointed out by Reher and Witter (1977), who

showed that Archaic sites along the lower Chaco River were located in respect to vegetative diversity. Schaafsma's (1978a: 52) survey in elevated lands near the San Mateo Valley showed that, in this area too, Archaic settlements were situated in high diversity locations. And even in areas where Archaic populations used areas of low topographic relief, they seem to have selected for the areas of highest vegetative diversity within that terrain (Gauthier and Stein 1977:18-19).

The relationship between Archaic settlement and ecological diversity is a topic which should be investigated whenever suitable Archaic data are located. The available evidence indicates that selection for diversity did characterize many local Archaic populations. The resulting opportunity for reduced mobility may have been the factor responsible for the growth of population which is evident at least in the Arroyo Cuervo region, and which will undoubtedly be documented elsewhere. This pattern of settlement produced consequences which were felt throughout the region for the remainder of the prehistoric era.

By perhaps the San Jose phase in the Arroyo Cuervo area the results of population growth were beginning to be felt. While during the preceding era the strategy for coping with population growth may have been to establish new canyon-head base camps, by the San Jose phase this had led to such a degree of territorial restriction that a genuine subsistence change was called for. This change involved a shift to increased exploitation of small-package foods, seeds and nuts. This is indicated in the archeological record by the inclusion of simple grinding tools in the technological repertoire (Irwin-Williams 1973). At the same time, the archeological record of San Jose base camps is both more concentrated and more extensive than in previous periods.

In the succeeding Armijo phase, significant changes occurred in land use, technology, and seasonal structure. Continued growth of population led to three adaptive responses: limited use of maize horticulture, seasonal aggregation, and increased social and ritual complexity. The seasonal aggregation is illustrated by Armijo Shelter, a rockshelter located at a canyon head near the best of the seep springs (Irwin-Williams 1973). Linking these developments, they can be seen to

have been an integrated response to population pressures. Insufficiency of food supply in restricted territories forced some portions of the local population to shift toward at least minor dependence on maize. The maize harvest in turn soon came to be an important winter food resource because of its season of harvest and storable properties. With continued population growth, now accelerated by an additional stored winter food, it soon became important to secure a means by which variations in the maize harvest could be evened out, to ensure that all groups would have sufficient winter supplies. In modern pueblos this has been accomplished by redistributing surplus foodstuffs through rituals (Ford 1972).

The case in the Armijo phase appears to have been similar. Following the fall harvest, populations aggregated at suitable locations to participate in ritual activities. Variations in this harvest were buffered through redistribution of surplus organized in ritual contexts. The resulting archeological record contains items reflecting ritual activities, found only at the location of aggregation. The increased social and ritual complexity, with higher costs, were an expectable response to the pattern of continued population growth.

Although this response was successful in alleviating the immediate problems faced by Archaic populations, at the same time it set the framework for more serious problems down the road. By alleviating the stringency of the winter lean season, an important check on population was broken. Thereafter, even more pronounced population growth is evident in the area (Irwin-Williams 1973: 11-15), and further adaptive changes were soon necessary.

By the En Medio phase, expansion of the settlement system was necessary. Localities of population aggregation, like Armijo Shelter, multiplied, although Armijo remained the only site with ritual artifacts. There was a shift to sharply demarcated seasonal camps, and a pattern of seasonal transhumance developed which lasted into the Trujillo phase (Irwin-Williams 1973:11-15). Most dramatic, however, was the late Archaic occupation of the West Mesa.

Compared with the adjacent Puerco, Jemez, and Rio Grande drainages, the West Mesa is

a marginal environment. It is deficient in surface moisture and contains lower degrees of ecological diversity than surrounding areas. Following the PaleoIndian era, no portion of the West Mesa attracted substantial human use until the late Archaic. Yet during the late Archaic the Rio Rancho area came to support a pithouse-dwelling population which may have been nearly sedentary in its use of the locale. This occupation of the West Mesa intensified through time, with growing populations eventually forced to exploit a lower trophic level in the West Mesa food chain (gathering and horticulture, rather than hunting).

It would seem that, by the late Archaic, population in the region had reached such a level that expansion out of the river valleys into the marginal West Mesa was necessary. It is no coincidence that this use of marginal areas follows closely in time the beginnings of maize horticulture, population aggregation, expansion of the settlement system, and increases in social and ritual complexity in the Arroyo Cuervo region. All of these changes are a form of intensification, requiring greater energy expenditure in subsistence pursuits and in social organization. All can be argued to reflect the stress of a growing population. This pattern suggests that by the late Archaic, this area of New Mexico had reached nearly the maximum population level for the subsistence adaptation employed (cf. Irwin-Williams 1973:15). As noted in the previous chapter, this level of stress in the late Archaic makes it easy to understand the development of sedentary, agricultural adaptations in the Basketmaker III period without resorting to diffusionary explanations.

AGRICULTURAL ADAPTATIONS

By the Basketmaker III period the Rio Rancho area had been abandoned, and populations shifted to the eastern edge of the West Mesa overlooking the Rio Grande. Here they settled near washes having gentle gradients down to the river, in locations suitable for floodplain agriculture (Frisbie 1967; Allan 1975). These locations clearly bespeak an agricultural strategy.

Similarly, in the Rio Puerco region, late Basketmaker/early Pueblo settlements shifted in location from high diversity

locations favorable for foraging, to wider valley bottoms where agriculture could be practiced (Irwin-Williams 1973:15-16).

The shift to major reliance on agriculture is a topic of enduring concern to archeologists, yet it has received little attention in the Mt. Taylor overview area.

The earliest maize in the Southwest was found by Dick (1965) at Bat Cave, south of the overview area. It dates to between 4000 and 3000 B.C. For centuries, however, it remained a minor portion of the diet, probably allowed to grow unattended at favorable locations which were visited during the harvest season. By the Armijo phase, population had grown to the level where maize had become important as a stored winter food. At this point the importance of evening out variations in harvest experienced by individual groups led to fall/winter population aggregations, ritual resource distributions, and increases in social complexity. Yet maize remained only a fraction of the diet. When continued population increases required yet further readaptation, the preferred options were expansion of the settlement system and use of marginal environments. Major reliance on agriculture came only when population had grown to the point that even these strategies were insufficient. The resulting agricultural strategies left the archeological record recognizable as the Baskemaker III period.

Coincident with the late Basketmaker shift to agriculture in the northern Southwest were changes in technology. The use of pottery expanded to the point where it was a major component of the technological assemblage, while the bow-and-arrow came to replace the use of the atlatl and spear. Glassow (1972a) has suggested that these developments were intricately linked to the practice of agriculture. Pottery was useful for soaking dried maize, for allowing foods to simmer unattended, and for conserving fuel. The bow-and-arrow provided increased hunting efficiency, necessary to compensate for the higher work time required for agricultural pursuits (Glassow 1972a:297-299).

One of the most intriguing aspects of the transition to agriculture is the possibility that not all hunting and gathering populations chose to immediately convert to this new subsistence mode. In both the Acoma and Grants areas, hunters and

gatherers and agriculturalists apparently coexisted for some time. With such coexistence there would have developed an array of interesting anthropological phenomena: territoriality, exchange, intermarriage, alliances, raiding, and possibly ethnicity. The interaction between foragers and early agriculturalists is a topic which merits attention in future research in the area.

In the early Puebloan periods, population growth is evident throughout the overview area (e.g., Fritz 1973; Ruppe 1953; Dittert 1959; Allan and others 1976; Weaver 1978). The consequences of this were predictable. In the Salado drainage (tributary to the Rio Puerco of the east), population growth forced eventual agricultural settlement in the eastern end of the drainage, the section with the poorest agricultural potential (Fritz 1973). In the Acoma area the early Pueblo period was characterized by increased trade relationships with external populations (Ruppe 1953; Dittert 1959). The San Mateo Valley witnessed aggregation and water control in response to population growth (Allan and other 1976). In Manuelito Canyon overpopulation eventually led to a point where the carrying capacity of the land was exceeded to such a degree that environmental degradation may have ensued (Weaver 1978). Fosberg (1978) has noted that in the Yellowhouse area of the Zuni Reservation, population pressure during Pueblo I forced settlement expansion during Pueblo II into areas with poor soil and water conditions. Despite these developments, local corporate groups apparently maintained an egalitarian form of organization during the early Pueblo period.

Thus, it can be seen that during the initial Pueblo era, cultural evolution in the region was set in a pattern of increasingly intensive land use. This pattern led ultimately to a number of outcomes: to participation in the Chacoan Interaction Sphere, and to competition, aggregation, and abandonment. It is appropriate at this point to review the Chacoan phenomenon.

Chaco Canyon is an east-west trending feature located in the center of the San Juan Basin. In and surrounding the canyon there developed what was without doubt the most complex level of socio-political organization that ever characterized Anasazi populations. The local evolution of this complex system is not

known in detail, although in any event, only the periods immediately preceding the rise of the classic Chacoan towns are of interest to us here. The prehistory of the area has been summarized by Vivian and Matthews (1965), Hayes (n.d.), Altschul (1978), and Judge (1979).

Prior to 900 A.D. Chaco Canyon experienced a pattern of cultural evolution which was somewhat, but not overwhelmingly, distinctive for the Southwest. Integrative mechanisms, such as the Great Kiva, were in use. And from very early times, Chaco populations maintained extensive trading relationships with surrounding areas. Judge (1979:901-902) has noted, for example, that 80 percent of Basketmaker ceramics were traded into Chaco from the Cibola area to the southwest, while during Pueblo II up to 90 percent of decorated pottery came from the Red Mesa Valley and utility ware from the Chuskas. Locally made pottery never amounted to more than 20 percent. By the 9th century A.D. the canyon supported a sizable population of small, independent pueblos, characterized by irregular masonry and unstructured ground plans.

But by perhaps 900 A.D. a major change occurred. In some parts of the canyon, particularly along the north side, the large Chacoan towns began to be built. By the Pueblo III period (beginning around 1030 A.D. in Chaco Canyon) at least 13 multistoried towns of several hundred rooms were occupied in or near the canyon. Coincident with this, Great Kivas were built, and a water control system established (Vivian 1970). The large Bonito phase towns display a variety of sumptuary items not common in the smaller Hosta Butte phase villages. Such items included turquoise, copper bells, macaws, and so forth. Most impressive of all, many of the Chacoan communities, both inside the canyon and throughout the San Juan Basin, were connected by a network of roads which was imposed upon the landscape (Lyons and Hitchcock 1977). These roads follow straight alignments, do not adhere to topographic contours, make sharp turns, and often contain masonry curbs and carved stairways.

The Chacoan phenomenon is unique in Southwestern prehistory. As such, explanations for its development have occurred at intervals in the archeological literature.

These explanations have been diverse in content and aim. Gladwin (1945), for example, attempted to explain the difference between Hosta Butte phase villages and Bonito phase towns by postulating that the latter succeeded the former in time. This was, of course, known even before Gladwin's work not to have been the case. Addressing the same question, Vivian (1970) has suggested that Chaco Canyon was characterized by two types of social systems: dual divisions, associated with irrigation, in the Bonito towns, and egalitarian descent groups in the Hosta Butte villages.

Relative to the origins of the Chacoan phenomenon, the suggestion that it was stimulated by Mesoamerica has been recently treated by Hayes (n.d.). Grebinger (1973), in contrast, believes that Chaco Canyon was organized as a ranked society, which evolved due to the influence of local resource imbalances. Altschul (1978) suggests that Chaco be characterized by the generalized term "hierarchical society." He proposes that Chacoan towns developed because of population increase and the adoption of an agricultural system dependent upon water control. The development of Chacoan characteristics throughout the San Juan Basin (what he terms the Chacoan Interaction Sphere), Altschul suggests, was due to a standardized response throughout the area to stress situations requiring greater cooperation, or at least communication.

In a major synthesis of the Chacoan economic phenomenon, Judge has suggested that during the Basketmaker III/Pueblo I era in the San Juan Basin the movement of goods and people throughout the area was common. Exchange between Chaco and the outlying areas was regular, and was based upon reciprocity among related groups. Such exchange helped to buffer resource fluctuations and to alleviate the effects of differential access to resources (Judge 1979:903).

By the first part of the 10th century, trade became more formalized, and may no longer have been based upon kinship. An incipient redistributive network emerged, based upon storage of trade items at Chaco. Craft specialization was practiced in turquoise production. Turquoise itself may have functioned to stimulate resource exchanges and productivity (Judge 1979:903).

During the 11th century the redistributive network became more highly formalized. There were full-time administrative specialists and craft specialists. The larger Chacoan outliers gained control over local resources, while a road and signalling network developed. Formal redistributive events took place at Chaco Canyon, with segments of the outlying population congregating there at appropriate times. At other times, the population of the Bonito towns may not have been large. They may have been staffed only by craft and administrative specialists, and caretaker groups (Judge 1979:903). Judge suggests that the presence of too many specialists, coupled with environmental degradation, eventually led to the collapse of this redistributive system (1979:904).

Judge's synthesis of the Chacoan economic system is appealing in many ways. It characterizes, albeit in a descriptive framework, processual aspects of Chacoan society which have not been presented before. The idea that the Bonito towns in and near the canyon served as administrative and storage centers, rather than as the residence of descent groups, is intriguing. In this regard, however, one should bear in mind Hudson's (1972) analysis showing that Pueblo Bonito was possibly built by two social groups, each employing a different standard of measurement. This fact suggests that descent groups may have been resident in Bonito towns, probably, as Judge suggests, specializing in crafts and administration. Such hereditary specialization bespeaks a rigidly hierarchical society.

Despite the attempts of Vivian (1970), Grebinger (1973), and Altschul (1978), no explanation for the Chacoan phenomenon has been advanced which accounts for the evolution of this system in its full region-wide expression. Altschul's (1978) study comes closest in this regard. Among the phenomena which need to be addressed in this regard are the following:

1. The nature of the regional Chacoan phenomenon.
2. The sociopolitical correlates of Chacoan archeological manifestations.
3. The functioning of local and regional exchange networks.

4. The evolution of the Chacoan social hierarchy.

5. The geographical extent of the Chacoan system.

The Nature Of The Regional Chacoan Phenomenon

It has only been recently that attempts to explain the Chacoan phenomenon have focused on it as a regional manifestation. Gladwin (1945) anticipated this approach, but he and his followers viewed the phenomenon as a widespread cultural entity. Altschul appears to have accepted this view, for although he adopts the term "Chacoan Interaction Sphere," he uses this to mean the traditional concept of culture area (1978:111).

Altschul's equation of "interaction sphere" with "culture area" needlessly confuses the issue. I have written repeatedly in this overview about the dangers of inferring cultural unity on the basis of archeological traits. Although I do prefer to use the term "interaction sphere" to describe the Chacoan phenomenon, it is neither necessary nor desirable to accept Altschul's characterization of it. Instead,

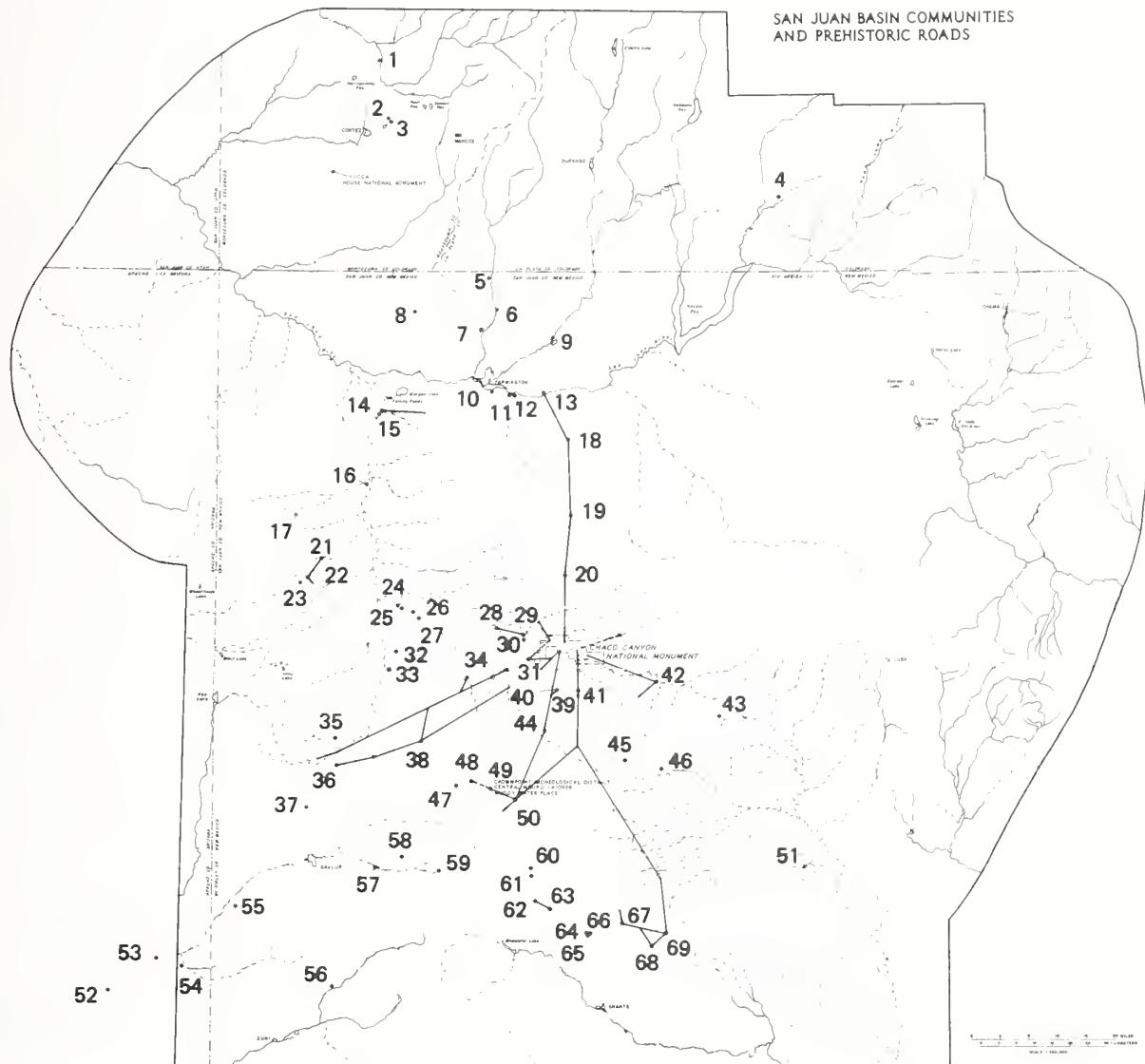
I prefer the definition of the concept originally advanced by Caldwell (1964): an area where high frequency interactions among separate societies have resulted in formal similarities in the archeological record of those societies. No degree of sociocultural unity is implied.

That the basis of this interaction was economic is now clear. As noted, Judge (1979) has shown that a widespread trading relationship characterized the San Juan Basin from at least the Basketmaker III period. By the Pueblo III period the region was integrated by a network of roads, leading like spokes to the center, Chaco Canyon. Allan and Broster (1978:5) have suggested that these roads functioned in the economic system to reduce real distance between centers, in terms of the labor required for transportation. These roads extend between the canyon communities and many of the outlying sites which display Chacoan characteristics (see Map 20). The latter sites in turn comprise what is called the Chacoan outliers.

Thus the nature of the regional Chacoan phenomenon can be postulated to have been a sphere of intense economic interaction in which exchange of material items led to sharing in cultural features.

Key to Map 20.

1. Escalante Ruin	25. Slab House	Estrella Site
2. Ida Jean	26. Willow Canyon - Weaver's House Group	49. Crownpoint Archeological District, Central Mound LA 10959, Muddy Water Place
3. Wallace Ruin	27. Willow Canyon Mesa Top House Group	50. Kin Ya'a
4. Chimney Rock	28. Lake Valley	51. Guadalupe
5. Morris Site 41	29. Casa del Rio	52. Sanders
6. Holmes Group	30. Mesa Tierra	53. Houck
7. Morris Site 39	31. Kin Klizhin	54. Allentown
8. Squaw Springs	32. Whirlwind Lake	55. Manueito
9. Aztec Ruins National Monument	33. Grey Hill Spring	56. Village of the Great Kivas
10. LA 8619	34. Indian Creek	57. Fort Wingate
11. Sterling Site	35. Tohatchi	58. Iyanbito
12. Jaquez	36. Grey Ridge Community	59. Coolidge
13. Salmon Ruin	37. Toh'la'kai	60. Casamero Lake Group
14. Hogback House	38. Standing Rock	61. Coyotes Sing Here
15. Hogback Great Kiva	39. Upper Kin Klizhin	62. Casamero
16. Sanostee	40. Kin Bineola	63. Andrew's Location
17. Tocito	41. Greenlee's Ruin	64. Haystack LA 12573-A
18. Kutz Canyon Pueblo (Twin Angels)	42. Pueblo Pintado	65. Haystack LA 12573-D
19. Halfway House	43. Raton Well	66. Haystack LA 6022
20. Pierre's Site	44. Bee Burrow	67. Kin Nizhoni
21. Newcomb	45. Kin Nazhin	68. El Rito
22. Skunk Springs	46. Mesa Pueblo	69. San Mateo
23. Crumbled House	47. Dalton Pass	70. Las Ventanas
24. Great Bend	48. Section 8, Casa	



Map 20. San Juan Basin Communities And Prehistoric Roads.
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Remote Sensing, Thomas R. Lyons, Chief.

Chacoan Sociopolitical And Economic Organization

Most recent authors who have considered the question believe that the Chacoan socio-political system was hierarchically organized (Grebinger 1973; Allan and others 1976; Altschul 1978; Judge 1979). In a recent discussion of archeological indicators of social ranking, Peebles and Kus (1977) have delineated five criteria which indicate a ranked society. These are 1) ascriptive ranking, 2) settlement hierarchy, 3) local subsistence sufficiency, 4) organization of production above the household level, and 5) organizational buffering of environmental fluctuations. As will be discussed, most of these characteristics may be demonstrated to some degree for the Chacoan system. Only the element of ascriptive ranking lacks clear support, due to a paucity of burials, and even this does not totally lack evidence (cf. Grebinger 1973: 9-10). At present, a hierarchical society in Chaco is indicated by the presence of apparently high status burials and sumptuary items in Bonito towns, a hierarchical settlement system, public works projects, and the centralized focus of the regional road system. Of these, the hierarchical settlement pattern merits more discussion than it has received.

A three level settlement hierarchy for the San Juan Basin may be postulated. The size of the Classic Bonito towns in the canyon, their abundant storage space, and their position as the central node in the road network, all point to these sites as first-order centers. Some of the outlying Chacoan towns, such as Aztec and Salmon, may also fit into this category.

Aside from a few Chacoan sites which may have serviced the road network (Loose 1979:361), the remaining outliers would have served as second-order centers, involved in coordinating local-level exchange, and in mediating economic relations between first and third-order centers. The third-order centers in turn were not really centers at all, only localized population aggregates occupying small agricultural villages, and often associated with a second-order center (Marshall and others 1979). A similar interpretive framework has been offered by Allan and Broster (1978).

In a settlement pattern of this sort hierarchical relationships exist for a reason. Interaction is not unstructured, being mediated where appropriate through the hierarchy. Thus, it may be postulated that exchanges would have occurred between first and second-order centers, between second and third-order centers, but not between first and third-order centers. Kinship-based reciprocal exchanges would have occurred among third-order centers in a single locality without the intervention of second-order centers, but such exchanges would not have occurred among second-order centers, or at least not on a regular basis. There is a very basic reason for this.

The location of Chaco Canyon at the center of the interaction network was a privileged position. It carried with it such prerogatives as access to greater resource diversity, accumulation of surpluses, wealth, and sumptuary items, and along with economic centrality, undoubtedly some measure of regional political influence. Yet all of this could be maintained only if Chaco remained as a necessary node in the exchange system. Once second-order centers began to deal with each other on a reciprocal basis, the fall of Chaco would have been inevitable. So the clear advantages of self-interest would dictate against allowing this to happen. In a related matter, during the course of researching this overview, a colleague suggested that eventually Chacoan roads will be found connecting the second-order centers (outliers) to each other. For the reasons just stated, I do not think this will prove to be the case, at least not on the level of the road network that has already been documented. Those roads which may connect outliers (for example, the possible system connecting San Mateo, El Rito, Kin Nizhoni, Haystack, and Andrews) probably functioned as local distribution roads, serving to accumulate or disperse the materials transported over the main roads.

This argument, based upon the perspective of the first-order center's self interest, is not the only (or even the best) reason why economic interaction between second-order centers would have been regulated through the hierarchy. There are reasons why the system would have had to function this way. These will be discussed shortly.

Diagrammatically, the hierarchical exchange system may be postulated to have operated as shown in Fig. 7.

This settlement hierarchy can be shown to correspond at least in part to a rank hierarchy. In the previous chapter, reference was made to the proposition that energy expenditure in mortuary ritual is related to the size of the social aggregated recognizing status responsibilities to an individual, and thus to the status of the individual. Ross Cordy has expanded upon this idea by proposing that the principles of social involvement and energy expenditure apply not only to mortuary ritual, but to residential construction as well. Cordy suggests that:

Labor expenditure involved in permanent housing construction positively covaries with the social rank of the household's highest ranking member (1978:120).

Evaluating this idea against an ethnographic sample of 56 cases, Cordy found uniform confirmation (1978:121).

Cordy's ideas have direct applicability to the Chacoan architectural phenomenon. In regard to the Casamero site, a Chacoan outlier located west of Mt. Taylor (see Map 21), Lester and Neller (1978b) have suggested that the labor required to build this site (Fig. 8), on the order of 25 times that required for a smaller pueblo, indicated that this site was probably the residence of a high status group. The large amounts of turquoise and decorated pottery at the site, and the presence of a Great Kiva nearby, support this conclusion.

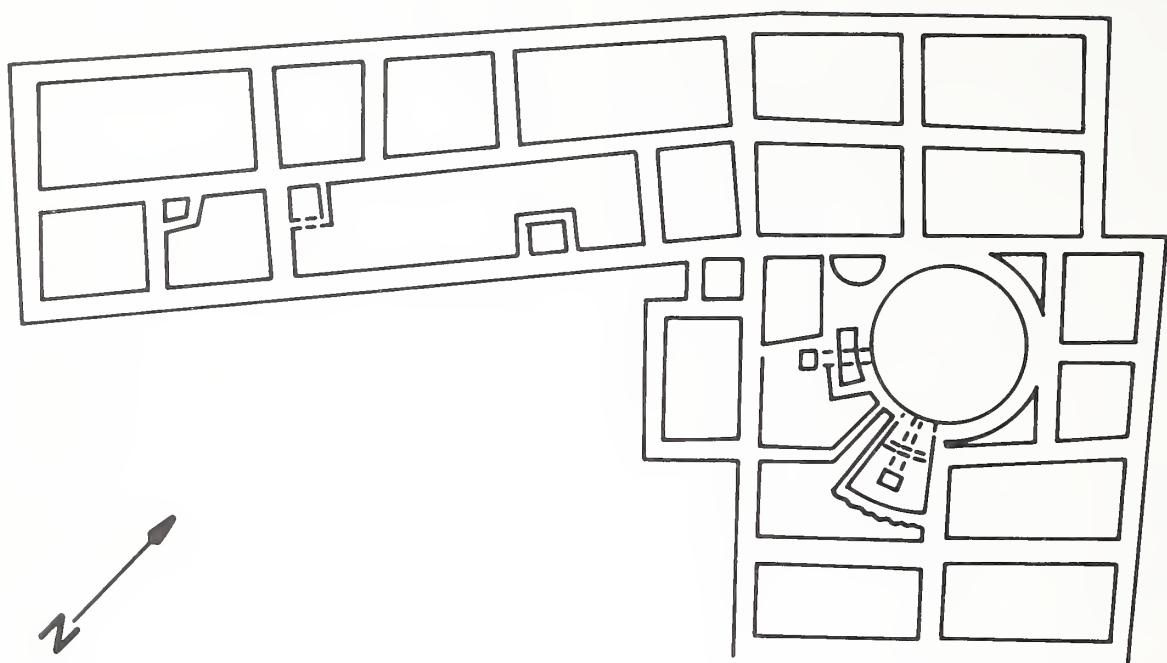
Similar interpretations can undoubtedly be made for most of the Chacoan outliers. The exceptions would be those outliers that seem to have functioned as way-stations along the roads. The larger Chacoan sites in and near the canyon, and near the San Juan River, would be interpreted similarly. Furthermore, the fact that the Chacoan road network leads toward these larger sites suggests that they comprised a superordinate status level. The idea that most Chacoan sites served as residences for high status descent groups seems plausible.

However, in a major, recent study of the Chacoan outliers, Marshall and others (1979) have suggested that the populations

of small, Hosta Butte phase villages, which regularly surround Bonito phase towns, were non-hierarchically organized, and that these groups used the Chacoan outliers for storage, for social aggregation, and for ceremonial, economic and administrative activities (Marshall and others 1979: 337-339). Marshall and others characterize the Chacoan sites as "Public Architecture" (1979:337). They base their argument on three main points:

1. Chacoan outliers contain rooms which are large, thick-walled, and have other features which might be interpreted as indicating storage.
2. Burials are not common in such sites.
3. There is often little trash associated with such sites.

These categories of "evidence" are easily countered. In their discussion of the Casamero outlier, Marshall and others (1979:135) produced a map showing the rooms of this site to contain a number of ordinary pueblo domestic features, such as hearths, fireboxes, bins, and grinding features. Several of these were placed right in the center of the room. It is difficult to see how such cluttered rooms could have been useful for storage. If these rooms were indeed intended for storage, they were not planned very carefully. But given the nature of these internal room features, it is more likely that the site was used for habitation. As for the lack of burials, Marshall and others fail to remind their readers that relative lack of burials is a common characteristic of Pueblo sites. Of the hundreds of Pueblo sites in the overview area which have been excavated or tested, only one (LA 4487) contains enough burials to represent what was probably most of the living population. Regarding trash disposal, it is quite likely that, if these sites were indeed occupied by local elites, their domestic density (ratio of persons to rooms), and hence their volume of trash production relative to site size, may have been low. Furthermore, it is not at all unlikely that members of a higher social stratum practiced different modes of trash disposal than lower ranking groups. Such a pattern is often seen in hierarchical societies (e.g., Hoffman 1974). Thus, Marshall and others have not considered the social aspects of site formation processes.



Map 21. The Casamero Site (after Lester and Neller 1978b).

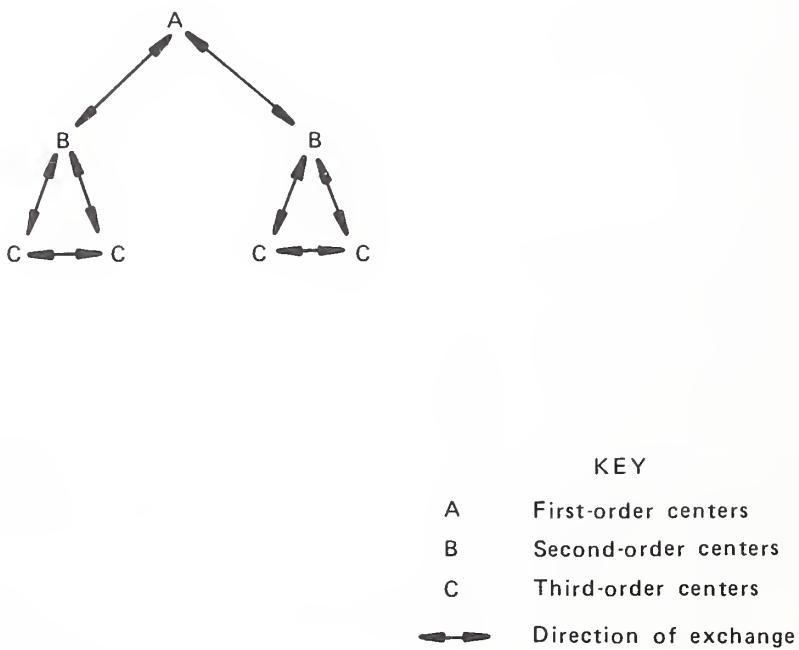


Figure 7. Exchange Hierarchies In The Chacoan Interaction Sphere.

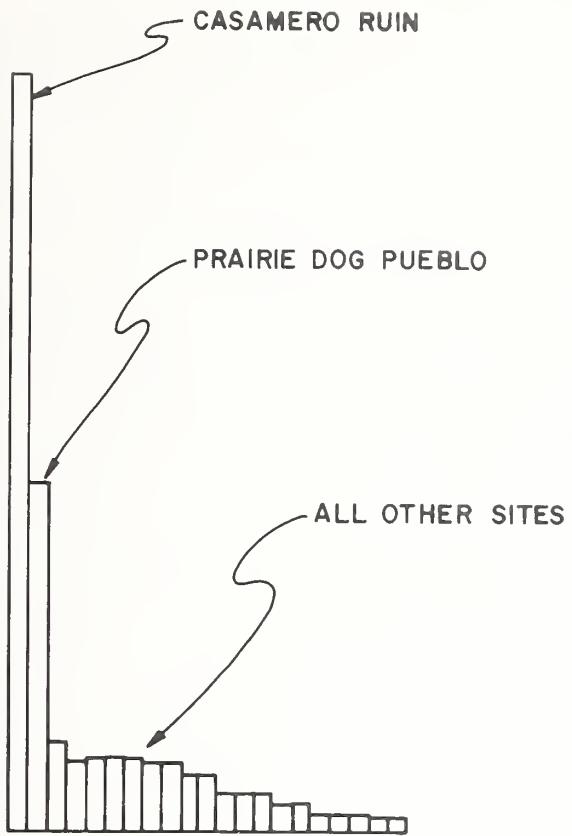


Figure 8. Labor Expenditure In Residential Construction At Casamero And Neighboring Sites (after Lester and Neller 1978b).

On a more general level, it is difficult to conceive of independent, egalitarian groups, storing their surpluses, freely and without social coercion, in a central location where the security of those surpluses could not be ensured. And it is even more difficult to conceive of these groups constructing costly public monuments for this purpose. Surely nothing could be more contrary to the Principle of Least Effort, not to mention enlightened self interest! Anthropologists have studied non-western economic behavior for decades. In the vast literature on this topic (cf. Sahlins 1972), I know of no documented society which has behaved as Marshall and others postulate for the Chacoan system. On the contrary, there are many examples of societies which have engaged in food storage, and in extensive food distributions, without going to the needless expense of monumental construction (e.g., Bean 1972). The burden thus rests upon Marshall and others to explain why the Chacoans would have behaved so anomalously, and indeed, so irrationally.

I do not wish by this discussion to imply that Chacoan sites did not serve public functions, for surely the Great Kivas at least did. In this I am in agreement with Marshall and others. Where I disagree is in their contention that Chacoan outliers were nothing but ornate granaries.

The Chacoan Interaction Sphere, which was controlled through the status hierarchy, operated on both regional and local levels. One function of exchange systems in nonmarket economies is to raise the level of the production and consumption unit from the local group, occupying a restricted territory, to the regional population, occupying diverse resource zones. The Chacoan economic system quite clearly served this end. This is evident when one keeps in mind Judge's observation that, from very early in the Anasazi sequence, Chaco Canyon populations were trading extensively with locations as distant as the Cibola area (1979:902).

The purpose of raising the geographical scale of the production and consumption unit was to buffer the effects of local productivity fluctuations. When population density is high, and population units are territorially constrained, it becomes necessary to ensure access to the produce of larger territories to guard against the effects of such things as localized droughts, frosts, and raids. By participating in a regional exchange system, as Hunter-Anderson (1978) has noted, a local group "insures" itself against bad years. The cost to the local group is contribution of its surplus during good years, to other groups or to a regional pool. Yet this contribution is not really a cost, for it allows a population unit to take a commodity which is perishable, foodstuffs, and convert it into reciprocal obligations, a "commodity" which is not perishable.

When exchanges occur on a local basis, between independent kinship groups, and are generally balanced, such exchanges don't require the development of an administrative hierarchy. Judge (1979:903) has postulated that this type of exchange characterized the San Juan Basin throughout the Pueblo I period. On the other hand, when the volume of exchanged goods is high, when exchanges occur among many groups spread over a large territory, or when reciprocity is delayed, two things may be necessary: the development of an adminis-

trative hierarchy, and centralized pooling of surpluses. A factor such as continual growth of population may force these developments. Judge believes that the Chacoan economic system reached this state by the first part of the 10th century (1979:903). The reasons why an administrative hierarchy are needed in such situations are several:

- 1) A hierarchy can provide for equitable distribution of resources, thereby reducing competition and conflict, and ensuring that the system functions as it should.
- 2) A hierarchy provides the necessary authority for "requisitioning" surpluses from local groups. This authority may be required when reciprocity is delayed, or may not be balanced.
- 3) A hierarchy provides for centralized pooling of exchanged materials, necessary when large, diverse areas participate in the system.
- 4) A hierarchy provides specialists whose purpose is to ensure that the exchange system operates efficiently by monitoring production surpluses and deficits throughout the region (that is, by processing information).

This last point most clearly illustrates why a hierarchy is needed for such a regional system. If each local group had to allocate resources toward the task of identifying potential trading partners, identifying these partners' yearly production levels, and establishing reciprocal obligations with these, the administrative costs, because of duplication by each group, would be enormous. These administrative costs are substantially reduced when the regional population jointly supports a single hierarchy which serves all local groups. So as suggested above, the hierarchical control of economic transactions is not simply an expression of political self-interest, it is the most efficient mechanism under the circumstances. For the San Juan Basin, the administrative hierarchy was centered in Chaco Canyon.

Sahlins (1972:229-230) has pointed out that in a system where exchange balance is delayed, where the amount that any group contributes to a regional pool may not be immediately returned, it is necessary to utilize material items which store value in

the interim. In areas such as California and Melanesia this requirement led to the development of primitive money (Sahlins 1972:229), that is, media of exchange of standardized form and value. In the San Juan Basin this may have led to the widespread circulation of turquoise and decorated ceramics, durable goods capable of storing value. This leads to an interesting point: if decorated pottery and turquoise were employed in the Chacoan exchange system as items to store value, and if the production of these items occurred at a more or less constant rate, then to prevent inflation (decline in value), it would have been necessary to eliminate such items from circulation in the system at about the same rate at which new items entered (cf. Flannery 1968; King 1971). For pottery this would have been no problem: ceramic vessels break constantly. But turquoise is essentially indestructible; had it been allowed to accumulate in the economic system, its value would have been reduced, and the craft specialists who manufactured it could not have been supported. Exporting turquoise helped solve this problem. In Chaco Canyon the problem was further averted by depositing large quantities of turquoise in caches, either in kiva niches (Vivian and Reiter 1960:29), or in stone cairns (Hayes and Windes 1975). In this manner, turquoise was eliminated from circulation, its value was maintained, and craft specialists could continue to be supported. This is not to suggest that Chaco populations intended this outcome when caching turquoise, only that this activity had the result I have described.

Among the Chacoan outliers, social hierarchies may have developed for reasons other than administration. Allan's account of the development of the El Rito outlier is illuminating in this regard (Allan and others 1976). In the late Pueblo II period, populations began to aggregate on a ridge along the southern edge of the San Mateo Valley. During this period the area began to overtly exhibit Chacoan characteristics, and construction began on the El Rito site. An alluvial flat with a perennial stream parallels this ridge, and is probably the best agricultural land in the area because it is suitable for irrigation.

In a economic exchange system which originally develops on the basis of balance and reciprocity, any long-term imbalance has

effects in not only the economic, but in the sociopolitical sphere as well. If any local group, over the long run, contributes more to the economic pool than it receives in return, then it will eventually come to hold an elevated sociopolitical position in the area, for its trading partners are eventually reduced to dependents. What is more, such a group will be capable of attracting recruits on a more frequent basis than its competitors. Northwest Coast potlatches provide an exaggerated example of both of these processes (Adams 1973). The end result is not only movement of goods to consumers, but also better distribution of producers among producing territories. Thus, preferential access to resources in a competitive environment may condition the emergence of local sociopolitical hierarchies.

Although available data are scanty, I would propose that something of this sort happened in the San Mateo Valley, and probably in other outliers as well. The initial agricultural population of the area was, as Allan has noted (Allan and others 1976), dispersed about the valley. A growing population forced one local group, with access to a favorable location, to develop a water control system in order to increase crop yield. The resulting agricultural success allowed this group to compete inequitably in local economic exchanges, with the end result that a hierarchical social system eventually emerged. This social hierarchy was based upon economic exchanges, with the group at the top sustaining segments of the population during lean periods, and the dependent groups repaying these "debts" by participating in public works projects such as the construction of the El Rito outlier. The success of the irrigation system was so attractive that soon the bulk of the population concentrated at its location, contributing labor to its operation, and becoming in turn ever more dependent upon the elites. In this way, a local system of many independent groups was, as a result of the process of population growth, transformed into a hierarchical, managed economy, characterized by elite administration, public works, and integration with the regional Chacoan system.

It is worth pointing out that this explanation does not require the assumption, made by so many (e.g., Allan and others 1976; Lester and Neller 1978b), that the

Chacoan outliers were occupied by groups from Chaco Canyon itself. The hypothetical events described above indicate that the emergence of the outlier phenomenon is perfectly understandable as a local event, which could have occurred independently of Chacoan intrusions. Nevertheless, the issue of just how extensive an influence the Chaco Canyon population did have on the development of outliers has not been resolved. It is, however, an issue which is testable, and not just from the perspective of skeletal biology.

If the Chacoan outliers were settled by excess population migrating out of the canyon then, all other things being equal, these settlements should have been founded initially close to the canyon, and more distantly only later in time. Thus, the outliers on the north side of Lobo Mesa should predate those in the Red Mesa Valley.

But of course all other things are never equal. Outlier territories vary in their productivity. All other things being equal, Chacoan populations seeking new land would be expected to settle first in the best agricultural areas, and only later in less favorable locations. Gauthier and Stein (1977) suggest just such a sequence for the El Rito and Casamero outliers. Combining these two points, Chacoan populations would be expected to have first established outliers in favorable locations close to the canyon, and to select less favorable and/or more distant locations only secondarily. An important contribution to Chacoan research will be made when data are presented for testing these expectations.

The reason why the Chacoan outliers are so often assumed to represent colonization from the canyon is because of their general architectural similarity to Bonito phase towns in Chaco itself. Indeed, such architectural attributes are the major defining characteristics of Chacoan outliers (cf. Loose 1979:358). Yet it is not necessary to assume colonization from Chaco to account for these similarities. There are other processes which could have led to the same result. In a classic paper dealing with this kind of phenomenon (regional archeological similarities suggesting colonization from a center), Flannery (1968) reviewed ethnographic cases where hierarchically-ordered societies, on

different levels of complexity, existed side-by-side, and interacted. Flannery found that in such situations, the elites of the less complex society tend to imitate the sumptuary behavior of the elites of the more complex society. He suggested that such imitation accounts for the archeological similarities between the Valley of Oaxaca and the Olmec area in Formative Mesoamerica. It may similarly account for the architectural similarities between the Chacoan outliers and the Bonito phase towns of the canyon. Viewed in this light, the Chacoan "outliers" may not be outliers at all, merely the residences of local elites imitating the more highly stratified society in Chaco Canyon.

I have argued in these last paragraphs that the emergence of the Chacoan outliers can be understood in terms of local processes, and that it is not necessary to postulate Chacoan colonists to account for the architectural attributes of these sites. Yet the issue remains open, for evidence to decide one way or the other is not available. Suffice to say that alternatives to the Chacoan colonists interpretation, while largely overlooked by current archeologists, are nevertheless plausible.

The Geographical Extent Of The Chacoan System

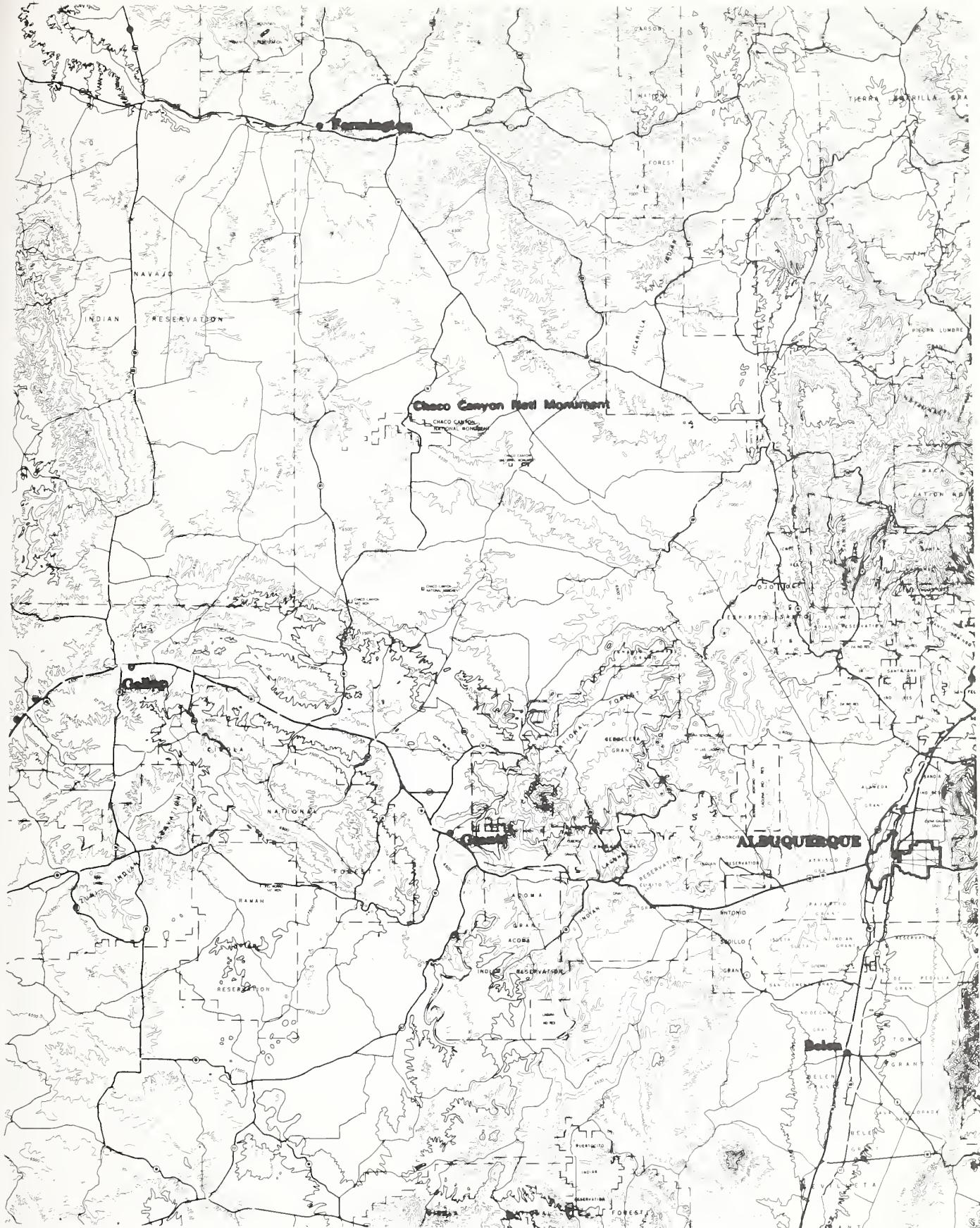
Of critical importance to understanding the evolution of the Chacoan Interaction Sphere, and the emergence of Chaco Canyon as the first-order center, is a consideration of the regional setting of the network.

One purpose of an economic exchange system is to gain access to resources not locally available. In a subsistence economy, a major goal of interaction is to gain resource diversity, that is, to obtain different kinds of resources or resources available in different seasons. This would have been particularly important in the San Juan Basin, which is an area of low topographic relief (see Map 22), and correspondingly low ecological diversity. For a population inhabiting such terrain the strategy in forming exchange alliances is to form them with groups living in different resource zones. It is possible with this point in mind to account for the geographical extent of the Chacoan Interaction Sphere. On an a priori basis,

how far in space would we expect an economic system centered in Chaco Canyon to extend? The answer is that it would extend as far as necessary to include the maximum possible ecological diversity, and no farther. When the topography of the San Juan Basin and surrounding areas (Map 22) is compared against the distribution of known outliers (Map 20), it can be seen that this is in fact what happened! To the south the occurrence of outliers stops when the ecological diversity of Mt. Taylor, the Rio Puerco of the east and the west, the Malpais, and the Zuni Mountains was included. To the west, outliers extend no farther than the eastern edge of the Chuskas. To the north, the San Juan drainage system and the highlands of southwestern Colorado were incorporated. Only on the east, in the high terrain of the upper Rio Puerco, are there no known outliers. Yet even in this area, interaction with the Chacoan system occurred, indicated by Chacoan style ceramics in the Rio Grande area (Cordell 1979:102). Thus, the geographical extent of the Chacoan Interaction Sphere is easily explainable: it extended far enough in each direction to provide populations of the central San Juan Basin access to a diverse resource base. Once this diversity was achieved, further expansion was pointless.

The central position of Chaco Canyon within this interaction sphere helps explain its elevated position in the exchange hierarchy. As a central place, Chaco Canyon was the most logical, most efficient, least-cost location from which to collect diverse resources and redistribute these throughout the region. Significant in this regard is the observation made by Schalk and Lyons (1977: 178-180) that Chaco Canyon lies at the ecotone between the sandy soil zone in the northeastern part of the basin and the clay soil zone in the southwestern section. It was thus situated in a position to mediate economic relations between areas which may have experienced varying regimes of agricultural success. Seen in this framework, Chaco's position as a high status, first-order center becomes understandable.

The geographical extension of the interaction sphere was facilitated by the construction of a road network which, as Allan and Broster (1978) have noted, reduced transport costs by providing quick, inexpensive routes for the shipment of



Map 22. Topography Of The San Juan Basin And Surrounding Areas.

resources. Ebert and Hitchcock (1973) have analyzed this road system as an integrated network. Following economic geographers, Ebert and Hitchcock draw a contrast between road systems which are highly interconnected, and those which are not. The former will tend to be built where construction investment is low, but transport costs are high, as in rural roads. The latter are built where investment costs are high, but transport costs are low, as in the interstate highway system. Ebert and Hitchcock have applied a measure of connectivity to an abstracted model of the Chacoan road system. Although their results may be tempered by the fact that not all roads have been found, the results are suggestive. They found the Chacoan roads to be minimally interconnected, a situation suggesting high investment cost and low transport costs. Noting the straight-line character of both Chacoan roads and modern superhighways, Ebert and Hitchcock (1973: 24) suggest that such a configuration holds where roads convey high volumes of traffic or large amounts of goods.

Road connectivity also covaries with a nation's economic development. In underdeveloped, poorly connected road networks, flows occur only between major centers, each of which exclusively serves and administers a number of subordinate centers. This suggests to Ebert and Hitchcock (1973: 24-26) that the Bonito towns were bureaucratic centers administering the labor organization of the population. This observation is largely congruent with Judge's (1979) suggestion that the great towns did serve as administrative centers, and with the argument advanced above (see Fig. 7) concerning the hierarchical organization of trade.

Lightfoot (1979) has investigated the efficiency of food transport in the prehistoric Southwest, in terms of cost in calories of transporting food versus the caloric value of the different foods. He suggested that, beyond a 50 km. range, transport by foot is not efficient, and would probably not have occurred on a regular basis. In fact, though, his transportation efficiency figures show that many foods can be efficiently transported up to 100 km. Two factors modify Lightfoot's conclusions in the present case. First, he assumes that transport is voluntary and benefits the person performing the work. In a hierarchically organized network, such

as the Chacoan one, neither may have been the case. Secondly, the road system of the San Juan Basin would have reduced transport costs, thereby extending the area that could be efficiently included in a transport system. The major value of Lightfoot's study is in showing that some foodstuffs, such as pinyon nuts, could be efficiently transported long distances, while others, such as squash, rabbit, and venison, could not be.

Summary: The Evolution Of The Chacoan Interaction Sphere

The evolution of the Chacoan Interaction Sphere may now be understood in its essential outline. From early in the Anasazi sequence, populations in the vicinity of Chaco Canyon engaged in balanced, reciprocal trade with populations in outlying areas, in order to gain access to a more diversified resource base. Their success in this led to further growth of population, until the point was reached where a reciprocal exchange system was no longer adequate for either the canyon's inhabitants, or for the outlying populations. By this time, social hierarchies were beginning to develop throughout the region, spurred by population growth and made possible by preferential access to resources on the part of some descent groups. Such elites managed local exchange networks, and involved populations in public works construction.

With the increase in population on a regional level, the number of exchanges needed by local groups multiplied, and exceeded the capacity of egalitarian exchange. A managerial elite then developed to serve the needs of an expanding regional network. Given its central location in the interaction area, Chaco Canyon developed into a first-order center, serving as a location from which surpluses could be concentrated and dispersed. A road system was built, serving the multiple functions of reducing transport costs, reinforcing Chaco's central position in the network, and providing a means for labor forces to repay the food subsidies they occasionally depended on. Material goods which store value, decorated pottery and turquoise, were produced in quantity to compensate for delays in exchange balance. The interaction system expanded spatially to incorporate areas of ecological

diversity, while still attempting not to exceed the distance beyond which transport of food would have been unprofitable. By the time the system was fully operational, a structured economic system existed in which resources were channeled up and down the hierarchy, and redistributed throughout the San Juan Basin, as local conditions required. The result was a network which worked to buffer productivity fluctuations and to increase subsistence security on a scale unparalleled at any other time in the prehistoric Southwest.

Decline Of The Chacoan Phenomenon, And Abandonment Of The San Juan Basin

The decline of the Chacoan Interaction Sphere, and the abandonment of the region, were major events in the prehistory of the Mt. Taylor overview area. Gauthier, Acklen, and Stein (1977) have suggested that the southern outliers in the Red Mesa Valley were abandoned early in the Chacoan sequence. Abandonment of outliers, and abandonment of the region, however, were different phenomena. The latter generally occurred some time after the former. Manuelito Canyon was apparently abandoned about 1325 A.D., while the San Mateo Valley experienced a 200 year occupational hiatus prior to a brief reoccupation around 1250. The Rio Puerco was abandoned sometime in the early 1300s, which may be about the same time that Cebolleta Mesa became depopulated.

Explanations for the decline of the Chacoan phenomenon have ranged from adverse climatic conditions to marauding intruders, to failure of the socioeconomic system to function in the proper way. Some explanations are highly implausible; others remain as off-the-wall comments thrown out without any substantiating basis, either empirical or theoretical. Two factors are at fault here: the lack of archeological data relevant to the phenomenon in question, and more importantly, the lack of any theoretical framework to explain the phenomenon. This last point is worthy of note. Anthropologists have spent years of research on the question of why complex societies have developed. I have drawn on the results of this research in formulating an explanation for the development of the Chacoan phenomenon. But anthropology has no corresponding theories to explain the collapse of these systems. This is a major

gap in anthropological research. The end of the Chacoan system thus joins the decline of Hopewell, the collapse of Classic Maya civilization, and other cases which will not be satisfactorily explained until appropriate general theories are developed.

The reasons for the abandonment by Anasazi populations of the San Juan Basin, including much of the overview area, are equally obscure. Explanations for this phenomenon generally revolve around some aspect of the regional carrying capacity. Reduction of carrying capacity, whether due to climatic deterioration or due to environmental overexploitation, is frequently cited as a likely reason why the region was abandoned. However, these factors, by themselves, do not really explain the phenomenon of abandonment. The reason is simple. A reduction in carrying capacity of a parcel of land would most logically be met by a corresponding reduction in the human population. Total abandonment, when partial depopulation would suffice, cannot be explained by the factors which are usually cited.

This is the logical problem encountered by Weaver (1978) when he proposed that the abandonment of Manuelito Canyon occurred when the agricultural subsistence base was insufficient for the population. Perhaps in recognition of this problem, Weaver developed ad hoc modifications of his hypotheses to suggest that abandonment occurred because the population developed negative feelings concerning the locale, and because of a wish to maintain the established social order (1978:314-315).

I will not dwell on the problems in studying a prehistoric population's wishes and feelings in the archeological record (although in fairness to Weaver I will mention that these are not the precise terms he uses). I do feel, however, that if pressed on the point, proponents of the deterioration argument would be forced to revert to the kind of ad hoc explanation Weaver proposes. It is appropriate therefore to evaluate this explanation.

Perhaps the most useful portion of Weaver's explanation is the notion that Manuelito Canyon was totally, rather than partially, abandoned in order to maintain the existing social structure. At the core of this explanation is the assumption that social

structures are maintained to suit the wishes of human populations for social continuity, regardless of circumstances. Taken to its extreme, this idea would deny the possibility of social change. More immediately, the collapse of the Chacoan socioeconomic system, despite what we may presume were the wishes of the elite to maintain their privileged position, contradicts the idea that social change, or lack of it, is a response to human wishes. Even more damaging to Weaver's ideas is the likelihood that, if Manueilito Canyon populations were motivated to maintain the existing social order, partial migration would have occurred long before population/resource imbalance forced the development of social complexity after 1250 A.D.

The perspective of this writer is that social structures are adaptable, changing in response to varying circumstances. In other words, social structures exist for a reason, and that reason may have no relation to a population's immediate wishes. Viewed in this framework, if a complex structure becomes unnecessary, it will presumably change. Given that more complex social systems carry greater energy costs per capita, and considering the increase in social complexity that characterized the terminal Kintiel phase (1250-1325) in Manueilito Canyon, it would seem possible that partial emigration, with accompanying reductions in social complexity and associated costs, may have been desirable to the canyon's inhabitants. Thus, there are reasonable grounds for arguing that the population of the area may have "wished" exactly the opposite of what Weaver supposes they did.

The purpose of this discussion is not to concentrate on a single study (although it is the only one in the overview area which tackles the abandonment problem), but rather to point out the flaws in the standard abandonment explanations. By now it should be obvious that simply citing deterioration in carrying capacity does not adequately explain the total abandonment of the San Juan Basin. This phenomenon remains as one of the most enigmatic prehistoric events of the area, and urgently requires attention.

PROBLEMS IN ARCHEOLOGICAL CLASSIFICATION

Classification of archeological phenomena is one of the most essential processes

carried out in the discipline. Given that phenomena observable in the archeological record occur in a bewildering variety of forms, some kind of classification is essential to even the most rudimentary analysis. For the purposes of the following discussion, classifications in the Mt. Taylor overview area may be broadly dichotomized as descriptive, where phenomena such as pottery vessels are classified into types, and inferential, where archeological phenomena are inferred to reflect sociocultural distinctions, such as Anasazi and Mogollon.

There are two principles to be kept in mind which apply to all classifications. First, any phenomenon can be classified in an unlimited number of ways, depending on the perspective and purposes of the classifier (Hill and Evans 1972). Thus, pottery vessels can be classified according to design, technique of manufacture, function, raw materials, vessel morphology, place of origin, place of deposition, or an infinite of less generalized attributes. Secondly, any classification, no matter how carefully contrived, results in some information loss. This must in turn be balanced against the information gained.

There are certain restrictions imposed by these principles which apply to both descriptive and inferential classifications. Since the outcome of a classification depends upon what the classifier seeks, it is incumbent upon a classifier to state what the purpose of the classification is, what attributes are relevant to achieve the typology, and how these are to be measured (cf. Clarke 1968). Most archeological classifications in the Southwest, whether of artifacts or of inferred cultural/temporal units, have not fulfilled this requirement. One result is that the independent reader cannot tell, when archeologists disagree about pottery types or about temporal units, whether the same phenomenon is being discussed by all parties. Just as importantly, if the basis for a classification is not described, it is impossible to tell whether it has been consistently applied.

I will not belabor the issue of artifact classifications, except to mention that the kinds of behavior that existing classifications are supposed to monitor are not always made clear. Hargrave (1962:9) suggests that Southwestern pottery classifications have as their objective the

isolation of local populations and temporal periods, yet one will search long in the literature for a discussion of which attributes are relevant for this purpose. Hargrave himself is vague on the problem, proposing that, "a pottery type refers to a group of ceramic vessels having in common a definite combination of objective characteristics which collectively describe that type and no other" (1962:8). But given the infinitude of attributes which may characterize a pottery vessel, operationalizing Hargrave's definition on an objective and replicable basis would seem to be impossible. As a consequence, the basis on which it has been operationalized may be neither objective nor replicable. Furthermore, it may not monitor the social and temporal dimensions in which he is interested.

Similar considerations apply to inferential classifications. We may well ask, what variations in behavior do we monitor when we utilize normative frameworks such as the Pecos Classification? Do such schemes monitor changes in social organization, in technology, in subsistence, in trade, in ritual, in population density? Available classifications do not attempt to explicitly monitor change in any of these. Instead the attempt is to monitor changes in archeological characteristics (such as architecture, pottery), with the assumption being that such features reflect changes in cultural norms. There are two problems here. First, the archeological features used to derive cultural/temporal classifications may or may not reflect prehistoric ideas, values, or beliefs (norms). Second, even if these features do reflect normative ideas, cultural/temporal classifications which focus on normative traits do so to the exclusion of a wide range of interesting scoiocultural phenomena. As alternatives to existing frameworks, it would be equally valid to classify temporally divergent archeological manifestations in terms of social complexity, or subsistence mode, or population density, or degree of external trade, or any other characteristic which is relevant to specific research questions. This discussion has an important implication: arguments over refining existing cultural/temporal classifications assume that real cultural/temporal distinctions exist to be discovered. This is simply not so. Depending on the purpose of the classification, there may be many cultural/temporal classifications for an

area, all useful for specific purposes, all equally valid, all equally "real."

The situation for areal classification is similar. It is as valid to classify spatially on levels of social complexity or on rates of technological change, as it is to classify on the basis of the normative traits used to define such entities as "Anasazi," "Mogollon," and the like. The notion that Anasazi and Mogollon reflect real socio-ethnic entities is simply not credible, given the vagaries in how ethnic groups actually do symbolize cultural differences. What is reflected in the Anasazi and Mogollon entities, and in other spatial trait distributions, is degrees of interaction among localized populations. Such interaction, being manifested in trade, intermarriage, and adoption of symbols, leads to the development of an archeological record showing broad similarities over wide areas. No degree of cultural unity is implied, nor is there any needed to account for the archeological distributions which are observed.

It is time that terms like "culture," "culture area," and even "tradition" were dropped from use when applied to the Anasazi and Mogollon entities, for such terms imply generational transmission of a distinct cultural heritage, a point which is now at issue. What remains is one of the most perplexing and intriguing research problems that I know of: the reasons why the prehistoric interactions that generated the Anasazi and Mogollon entities were patterned in the ways that they were. Put more simply: why is the apparent Anasazi/Mogollon "boundary" located where it is? For that portion of the boundary which runs through the overview area, the answer may ultimately be related to the integration of ecological diversity provided by trade networks centered in the San Juan Basin. Populations located at the southern edge of the basin, with access to higher elevation resource zones, would have profited little from interacting with groups to the south, in similar ecological settings, for such groups would have shared similar resource bases. But interacting with groups to the north, with different resource bases, would have been a more profitable activity. The observed Anasazi/Mogollon boundary in the overview area may reflect this form of interaction. It is probably no coincidence that this boundary, in the study area, closely parallels the southern edge of the

Chacoan Interaction Sphere. It was the advantages to economic alliance between the San Juan Basin and the Zuni-Mt. Taylor uplands, and the lack of advantage to

interaction with populations further south, which led to the formation of this apparent boundary where it is now observed.

HISTORIC PERIOD

INTRODUCTION

The distinction between "history" and "prehistory" observed in this volume simply recognizes that, in 1539, representatives of a literate society first came into contact with earlier inhabitants of the study area. Archeologists deal with material remains of cultures by way of a set of techniques which are applicable to remains regardless of the existence of documentary materials. Historians study the written records of a people who either wrote or were written of by others. Historical archeologists are specialists who draw on both disciplines. All students of past cultures can find much of interest within the study area.

Although New Mexico entered history in 1539, much of the state was not immediately observed by a writer's eye. Spanish records naturally focus on those subjects most of interest to Spaniards. Thus, we have reports on the economic condition of the natives, events touching on spiritual matters and the affairs of political or military figures. The "wild" Indians remained mostly ahistoric for a long time and their lands were terra incognita.

It is apparent that, when discussing large tracts of a new frontier, the notion of a start to the historic period is fuzzy. We can speak of a history of Zuni Pueblo starting with Coronado's records of the 1540 campaign but must remember that relatively few written words describe the life ways of sixteenth century Zuni. Thus, the archeologist has much to contribute to an understanding of those "historic" times. Of the Navajo, who were no strangers to the Zuni area, still less is known from documents of that time. If Coronado was not aware of the Navajo, they were probably aware of him and perhaps even acquired Spanish artifacts at an early date.

The bibliography contains items used in the preparation of the historical chapter but is not as exhaustive as for the prehistoric chapters. I have attempted to confine the citations to those which are most likely to be available to land managers who wish to pursue issues raised here. For this reason there are no citations in original Spanish and almost all sources are published rather

than manuscripts. A bibliography which included every original source and published comment would have been unmanageably large and mostly a wasteful repetition of information available elsewhere. For example, one might consult the bibliography of Swadesh (1973) for 813 citations relevant to New Mexico. Another consideration was my desire to avoid inflation of the bibliography with the many general histories of New Mexico which often do not focus on the study area.

The following overview of historical events and patterns in the study area will draw heavily from the synthesis of others. It is limited by the perceptions of those who created the source documents, the interests of those who distilled them into history, and by the capabilities of this author. Another writer would find much in 400 years of history which I do not choose to highlight.

BEGINNINGS OF HISTORY

The honor of being first to acquaint New Mexicans with the Old World appears to belong to the party of Friar Marcos de Niza, an Italian Franciscan (Nice, now French, in the sixteenth century was Italian and part of Spain's European Empire), and more specifically to his negro guide known to history only as Estevanico. The following year, 1540, saw Coronado reach Zuni and begin large-scale exploration of New Mexico. There was then a hiatus in exploration, due largely to Coronado's failure to find riches, which ended with the expedition of Friar Augustin Rodriguez and Francisco Sanchez Chamuscado in 1581. Still more information was reported by Don Antonio de Espejo who attempted the rescue of Chamuscado's friars in 1582. These later expeditions took back to Mexico stories of potential treasures and also the less exciting, but more valid, news that there was land available for colonists.

Niza's interest in the lands north of Mexico was aroused by accounts of the journey of Cabeza de Vaca and the prospects they gave for finding many civilized Indians who might accept Christianity. The interest of Viceroy Mendoza (and of

Governor Coronado in Nueva Galicia) was aroused by the promise of gold. At Mendoza's bidding, Niza's small party headed north into Arizona and eventually reached a point near Zuni. Estevanico, a survivor of de Vaca's trek from Florida to Mexico, ranged ahead of Niza and sent back messengers with glowing reports of rich cities just ahead. The negro succeeded in living well off the land until he reached the Zuni pueblos where he was met with suspicion and hostility.

Estevanico lost his life at Zuni in 1539 but some of his Indian companions escaped and carried to Niza hair-raising tales which convinced the friar that it would be unsafe to try to enter Zuni. He did persuade some Indians to guide him to the vicinity and he later reported to Mendoza that he had viewed a large, rich city from a safe distance.

It has been suggested that a New Mexican sunset may have enhanced the image of the stone pueblo and, charitably, may account for Niza's otherwise inflated regard for the city he never reached. Also, he had been pumped full of tales of the wealth of the province and Estevanico had dropped rumors of gold and gems like so many breadcrumbs to lead on the priest. Relative size descriptions are put in perspective by remembering that Mexico City, in the early sixteenth century, was a ruined city with a population of about 2000. It is harder to find justification for Niza's tales of riches in Cibola.

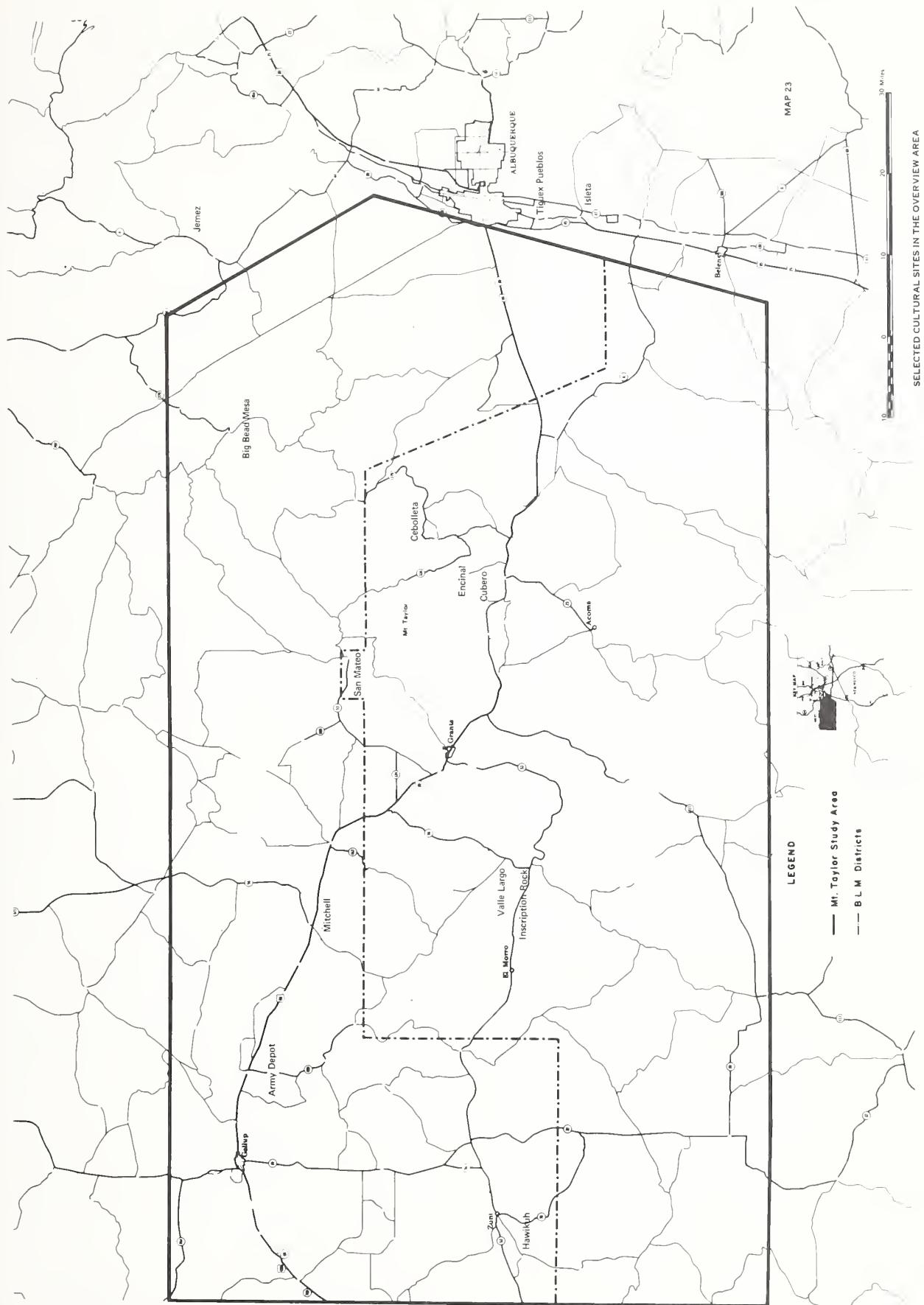
Indian legend told of seven rich cities in the north where metal workers lived (Twitchell 1911:I, 137). The lure of gold magnified the importance, perhaps even the very existence, of the cities "larger than Mexico" and made them logical targets for exploration. Some scholars think that the Hopi towns were the inspiration for the story but Coronado, finding the major Zuni pueblos, was prepared to discover "seven cities" and these he named the cities of Cibola with no less justice than Columbus used in naming the Caribbean islands for India.

An early myth preconditioned acceptance of the seven cities story. It was told that seven bishops had fled from oppression in Portugal and led their flocks to establish new cities in the west. These cities were

said to be rich and their Christian populations were sought as allies in conquest of the Indians (Hodge 1937:1-3). Eager to prove the truth of this tradition, the Spanish converted vague descriptions of adobe villages into corroboration of the seven cities. The precise origins of "Cibola" are uncertain but it has been noted that a cognate exists in the Isleta language and refers to bison. It would not be strange if the impressive new animals found by the Spanish should loan their name to the region first subjugated by Coronado. Today the word has become the Spanish word for bison and the name has been given to the National Forest in which are included all of the study unit's national forest lands.

It is generally agreed that the pueblo first seen by Fray Marcos de Niza, and the first to be subjugated by Coronado, was the Zuni site now known as Hawikuh. The ruins of Hawikuh lie about fifteen miles southwest of Zuni very near the Arizona-New Mexico state line (Map 23). This large archeological site was excavated by Hodge between 1917 and 1923 for the Southwest Museum and may thus qualify as the first example of historical archeology to have been executed within the study area. Although there were no such things as historical archeologists in 1917, Hodge made good use of known documents relating to Hawikuh and coupled that scholarly research with fine field work. Photographs of his excavations demonstrate archeological technique still enviable today (*op. cit.*).

Coronado set out on his famous expedition in 1540 with the most impressive army yet mustered by the Spanish in the New World. Gathering up the idle noblemen of Mexico and building a supply train of thousands of animals and many hundreds of Indians, he had an establishment which would not be equalled until the army of Ugarte attempted to smash the Apaches 200 years later (Moorhead 1968). He soon found that his long supply train was a tail which could wag the dog. Anxious to push ahead more quickly, he hand-picked less than a hundred favorites and moved in advance of the bulky main force. It was the smaller band of followers which presented themselves, tired, hungry and somewhat tarnished in front of Hawikuh on a summer day in 1540 (Twitchell 1911:I, 184).



Map 23. Selected Cultural Sites in the Overview Area.

No Spaniards were killed in the taking of Hawikuh (Fig. 9) although the defenders tried hard to achieve that end. Coronado



Figure 9. Ruins of Hawikuh, first of the towns subjugated by Coronado.

himself was injured and may have lost his life had he not been rescued by the Army Master, Cardenas. Dressed in golden armour, Coronado had been a conspicuous target and attracted more than a fair share of the Indian's wrath. Eventually the defenders were driven out of the village by fire from cannons and muskets, the first time such modern weapons had been used in New Mexico (*ibid.* 189).

Looking about at their conquest the Spanish soldiers found little support for Niza's stories of gold. The hard truth was that no easy wealth would come out of New Mexico: this new land had not a small fraction of the gold known to the Aztecs. The friar, with tarnished reputation, found it expedient to make a quick return to Mexico.

Coronado's men feasted on the spoils of victory at Hawikuh and rested up for further adventures. Information was gathered about other pueblo areas so that fresh explorations could be attempted. One party was soon dispatched to visit the Hopi: Don Pedro de Tovar reached the Hopi, known to him as the Tusayan. It was also from Hawikuh that Don Garcia Lopez de Cardenas set off on a mission to explore to the west in which he discovered the Grand Canyon of the Colorado River. Indians from Pecos pueblo visited Coronado at Hawikuh during this time and extended an invitation to visit their province.

Hernando de Alvarado was sent with twenty men to Pecos. He left in August, 1540, going via a trail leading through Acoma. Alvarado was well received and he urged Coronado to follow with the army which had by then caught up with him at Hawikuh. Thus, the reunited force finally came to winter among the Pecos Indians and the study area became of secondary importance until the weary explorers retraced their steps to Mexico in 1542.

Spanish presence in New Mexico did not end completely when Coronado marched back to the south. A few Friars, some negro slaves, and Mexican Indians with their families elected to remain behind when the army left. The Franciscan Juan de Padilla, with some lay brothers and novices, wished to stay to make converts among the pueblos of Tiguex along the Rio Grande. On passing through Hawikuh, several of the Christianized Mexican Indians received permission to stay there. Thus, following the passage of a great European army, the total continuing foreign impact on the study area was reduced to a handful of Mexican Indians who may have enriched the genetic pool of the Zuni area but probably had few material goods from the Old World. The priests did not long survive but later expeditions found that their Indian companions had been assimilated into pueblo life.

For New Mexico's Indians Coronado's expedition must have been a far from happy event. The army had eaten its way through Pueblo food reserves and liberally shared Spanish genes. Some pueblos were burned while many warriors died defending their homes. The knowledge gained of a new land by the Spanish could hardly offset the Pueblos' loss. After the grand events of Coronado's day the study area became a backwater of Spanish interest. The 1540 expedition had documented the geography of the study area as well as the habits of its people but there was prospect of little reward for further exertions. The valley of the Rio Grande seemed to promise most value and so became a focus of Spanish activity with later trips to Acoma or Zuni merely minor excursions. Thus Espejo, ostensibly having come north to attempt rescue of Chamascado's stranded Friars, made a brief foray into Zuni country in 1582.

At both Acoma and Zuni Espejo's company was well received. He found the Mexican Indians left behind by Coronado and

obtained from them further news of the country to the west. Espejo was followed by only a handful of men yet he was able to show the flag over almost as great an area as had Coronado while avoiding hostilities altogether. Not a man lost his life and no Indians were despoiled as had often been their lot when Coronado scourged the land. Trade goods were again left behind by these departing explorers but still the total impact of new goods must have made little change in traditional Indians ways.

DRAMATIS PERSONAE

Historic Indian Groups

Within the study area it would be convenient to distinguish two basic types of Native Americans during the historic period, nomads and sedentary Indians. The Athapascans and Pueblos are the dominant Indians although there are known instances of Utes and Plains tribes making raids south of the San Juan River and west of the Pecos. The Pueblos are the village dwellers whose past has been discussed in early chapters: the Athapascans, named for their linguistic group, are represented in the study area by the Navajo and other Apaches. Of these, the Navajo are best known and are today far more numerous, comprising about twenty percent of all living American Indians.

To briefly summarize, in the sixteenth century the Pueblos were village dwellers with a long history of occupation of New Mexico's main riverine habitats of the upper Rio Grande and on the Mesa country to the west. In several dozen villages some 40,000 Pueblos lived in apartment-like buildings constructed of mud, wood and stone. Their fields provided them with enough food to support a culture rich in ceremonial activity and even allowed some trade of surplus with the hunting and gathering peoples who surrounded them. Several different linguistic groups cut across the similarities of material culture which defines the Pueblos. Even more divisive was the total lack of inter-pueblo organization. Each village was largely self-contained, uniting with neighboring pueblos only briefly and for limited objectives.

Unlike the Pueblos, the Navajo entered the study area late, probably at about the same time as the Spanish. Their exact time of

arrival is difficult to fix because they were not numerous at first and followed a life style more mobile than that of the Pueblos. Much archeological field work has been devoted to search for early Navajo sites because of their relevancy to land claim cases (Horr 1974). Sites have been discovered far removed from the present Navajo Reservation but not all sites so identified were unequivocal evidence of Navajo occupation.

Early Navajo dwellings are referred to as forked-stick hogans. These were built by erecting three forked cedar poles as the main structural member. This frame was filled in with other poles and then plastered over with mud. A covered doorway extended a short distance to the east. The style continues to survive today in a smaller version as the sweat lodge (Baldwin 1970:125). Buildings constructed in this fashion make difficult subjects for the archeologist but one was found to date to about 1500, a time which must be very near the earliest Navajo entry to the study area and which predates the first written reference to them by a hundred years. Full descriptions of the forked-stick hogan and the more rare circular stone hogan may be found in Keur (1941:22-27).

The Athapascans did not have social groups of the size and complexity of their Pueblo neighbors. Their dwellings occur singly or in small groups rather than in villages and political authority extended from a strong leader only to his close kinsmen. The failure of the Spanish to recognize this degree of organization lead to the signing of spurious treaties which were "broken" by kin groups not party to the agreements. To these Indians a treaty was a truce, not a long term obligation.

Early Spanish encounters with the Navajo were in a context of competition and warfare, a pattern which outlasted the Spanish period and ended finally only when the U.S. military subdued the tribe. The threat of Navajo attacks became much more dangerous over the years as their numbers increased and they acquired horses and firearms. Also, the accumulated dislike for Spanish peoples increased due to the harshness of Spanish retaliatory raids and slaving expeditions.

Other Athapascans, Apaches, also posed a military threat to both the Spanish, Mexicans, and Americans. By the mid

seventeen hundreds the Spanish were distinguishing between the Navajo and the more nomadic Apaches while still recognizing that they spoke related dialects.

It became an important part of Spanish military policy in the 1780s to drive a wedge between the various nations of Apaches and so they encouraged war between the Navajo and the neighboring Apaches such as the Mimbrenos and Gileños. The Navajo found that they had become tied to the Pueblos and Spanish through increased need for trade and for a peaceful setting in which to enjoy the fruits of a herding economy. Neither the Spanish nor other Apaches would allow them to remain neutral and eventually the Navajo were squeezed into a Spanish alliance (Moorhead 1968: 176).

The culture of Apaches remained less complex than that of the Navajo although they were quick to adopt from the Spanish horses and other things which fit their lifestyle. The Apache were perhaps the pre-eminent masters of guerrilla warfare. Time and again they managed to escape annihilation as the Spanish brought armies against them (Moorhead 1968). They had no territory to defend, nor resources which could be destroyed. They were free to move swiftly with their limited possessions and make lightning raids where defenses were weakest. Relatively few in number, the Apaches effectively denied the use of some 80 percent of New Mexico to the Spanish and preferred peace to war only when the Spanish made it worth their while.

Apache shelters were even more crude than those of the early Navajo, mere collections of scrubby tree branches, called wickiups, which were abandoned with no regrets whenever they were contaminated by sickness or when local food sources diminished (Matson and Schroeder 1957:339). Perhaps the most common artifact associated with the Apache is the mescal pit, rough earth ovens up to 20 feet in diameter and as much as 5 feet deep, in which were roasted the hearts of such flora as the century plant. The mescal was an important food source which was either eaten immediately after roasting or dried and stored for later use (Baldwin 1970:122).

Spanish

The character of the Spanish people needs little description here. These were the same bold men who, coming in small numbers, had quickly subdued the civilizations of Mexico. Capitalizing on the newness of their military equipment to the eyes of the American Indian, they had used fear and confusion as an ally in overcoming many times their own numbers. Enlisting dissidents to their cause, they had been able to conquer where more timid people would have perished. Such men are not well suited to the ordinary domestic tasks of frontier farmers so they were not attracted to New Mexico except in the role of soldier, priest or administrator.

Mestizo

What does need some further explanation is the fact that, of those who are referred to as being "Spanish," few had ever lived in Spain. In fact, the earliest invasion of New Mexico was composed more of native Mexicans than Spanish although many of the Mexican Indians were culturally Spanish. There were racial mixtures of every degree which resulted from intermarriage and less formal arrangements between the conquerors and subject peoples of Mexico. This racial blending did not stop at New Mexico's border but rather became richer as all of its tribes entered the gene pool. The new racial population came to be known as "mestizo" (Meinig 1971:13) and was the majority from early in the colonization period until influx of Americans lessened their importance. Although the non-Indians of New Mexico are referred to as "Spanish" here until the establishment of the Mexican Republic, it would be more accurate to reserve the term for the few ricos, priests and government officials who either bred only within limited aristocratic circles or who were freshly arrived from Spain.

Hispano

A second term in wide usage for reference to the mestizos is "Hispano" or the near cognate, "New Mexican." When used herein these are intended to designate those non-Indians who are culturally Spanish to a

degree which precludes their inclusion as "Anglo," another term which attempts to homogenize wide diversity. All these terms represent wide spots on a continuum of population variety rather than precisely defined concepts. All exist more vividly in the minds of the people of New Mexico than in any reality of genetics or absolute cultural values (Table 23).

Genizaros

The genizaros were a social rather than genetic group. These were the Indians captured from various tribes to serve as slaves of the Spanish. Some were ransomed from tribes by the Spanish and may thus have originally lived far beyond the Spanish frontier. At first the genizaros were given to Christian masters who would be responsible for their acculturation and receive their services. Later, following disclosure of extensive abuse of the genizaros, separate towns were established for them on the frontier where they could serve as buffers against the hostile nomads (Simmons 1969:16). In culture, the genizaros became Spanish and lost their tribal identities.

COLONIZATION (1590-1680)

In 1590 the first colonization of New Mexico was attempted by Gaspar Castano de Sosa. His small party reached Pecos and explored along the Rio Grande but no colony resulted. Don Gaspar neglected to obtain permits for his expedition and the government reacted with the fury of a bureaucracy spurned. Returned to Mexico in chains, Don Gaspar's efforts came to naught and in any event had not penetrated the study area (Bancroft 1890:100-107). Several other hopeful conquistadors put forward proposals for the settlement of New Mexico but their proposals were rejected until Don Juan de Onate put together an acceptable plan in 1595.

The story of Onate's conquest was related in the 16th century poem of Gaspar Perez de Villagra (1933), a work more notable for its historical veracity than lyrical quality. Onate was beset by the same bureaucrats which frustrated the earlier colonizers but he persevered and his people finally left Mexico in 1597. Some

200 armed men marched with Onate along with friars of the Franciscan Order, more than a hundred families with almost as many wagons and seven thousand head of livestock (Twitchell 1911:I, 310). Clearly, this was a group which intended to stay.

The colonists' attention initially focused on the pueblos of the Rio Grande valley and the Pecos area, perhaps reflecting their choice of San Juan pueblo as a base. Soon the study area also was explored. In October of 1598 Onate reached Acoma which received him peacefully as did Zuni a few days later. Following close behind Onate, Juan de Zaldivar entered Acoma with a few men and found the natives not as peaceful as they pretended. Eleven Spaniards lost their lives in a trap sprung in the pueblo on December 4th. Soon the Spanish mounted a retaliatory force against Acoma. In the bloody battle which ensued hundreds of Indians died and the pueblo was burned. The success of less than a hundred Spaniards against the nearly impregnable Acoma with its approximately 2000 inhabitants was a lesson not lost on the other pueblos, and so a period of peace followed. A few hundred survivors of Acoma settled on the plains in the vicinity (Forrest 1929: 166).

It was during this period that Juan de Onate inscribed his name on Inscription Rock, El Morro. His was the first legible inscription at the site and commemorated his safe return from explorations to the west (Fig. 10). It is thought that the inscription refers to discovery of a route to the Gulf of California, just one of many expeditions of this period which set out to learn the limits of Spain's northern frontier.

In rough outline, government of New Mexico during the next eighty years was a series of confrontations of interest groups. The main Spanish protagonists represented the church on one side and secular government on the other. Both sides sought to extract maximum financial gain from an Indian economy which was, at best, marginal. Accusations and recriminations highlight correspondence between the colony and Mexico with both the lay and clerical sides each seeking to discredit the other. The Indians labored largely in silence although numerous small and unsuccessful attempts at rebellion punctuated the period. The colonists remained few in number and

Table 23. Accretion of Cultural Groups in and around Study Area

Culture	Time				Provenience	Comment
	1600	1800	1900	1970		
Pueblo	x	x	x	x		
Navaho		x	x	x		
Apache	x	x	x	x	Aboriginal	
Comanche	x	x				Sent to reservation in Oklahoma
Spanish	x				Immigrant	Largely officials and priests; withdraws or merges into Hispano
Hispano		x	x	x	Immigrant	Identity develops in place
Northern Anglo-American			x	x		Commerce and ranching; includes early Jewish merchants
Mormon			x	x		
Texan			x	x		
Mexican-American			x	x	Immigrant	
General Anglo-American				x		From all parts of U.S.
Afro-American				x		

x = Present in significant numbers.

(Table adapted from Meinig 1971:128)

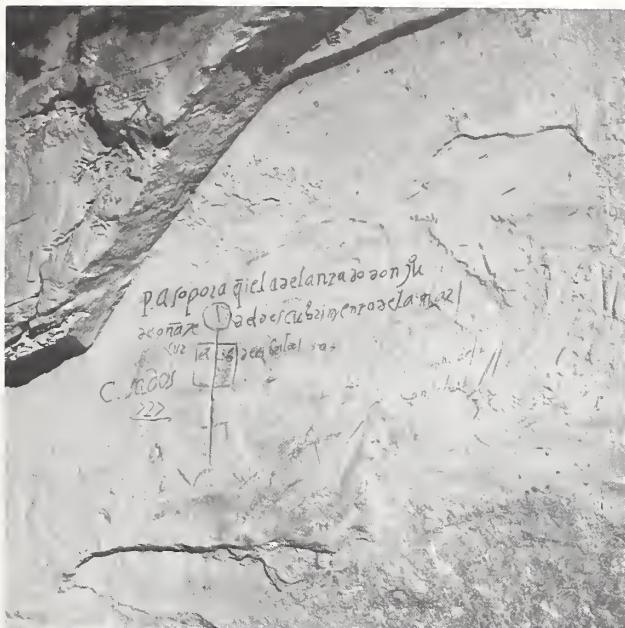


Figure 10. Spanish inscription carved over an Indian figure at El Moro. The inscription reads, "Paso por aqui el adelantado Don Juan de Onate del descubrimiento de la Mar del Sur a 16 Abril de 1605.) In English it reads, "Passed by here the Governor Don Juan De Onate, from the discovery of the Sea of the South on the 16th of April, 1605" (Carson 1967:22).

largely subsisted on the labor of the natives rather than seeking to establish their own agricultural systems.

The moral atmosphere of colonial New Mexico could provide the plots for many spicy books. The fact that neither the clerical nor lay leadership was notably elevated above the general moral morass is frequently remarked upon in histories of the period. Scholes states that:

Ignorance, superstition, and moral laxness characterized the life of the Hispanic community, and the governors - and even the clergy - often set an evil example for the humbler members of the colony (1942:6).

Other considerations kept the Spanish wary of the Indians. New Mexico was more than a few pueblos surrounded by a vacuum. There were less civilized tribes on every side. These had existed in delicate balance with the more domesticated peoples of the river valleys. For example, trade patterns were

established in which surplus meat from the plains was purchased by the pueblos with surplus grain. Mutual needs forged relationships which restrained raids (Forbes 1960:119-121). Into this picture of harmony, which can be overdrawn, came the Spanish with quite different views of their distant neighbors. Initially the Spanish were willing to simply supervise the old trade networks in order to skim off a profit. Eventually they tried to squeeze out the plains tribes and other "wild" Indians, perhaps not realizing that their energies would turn to new ways of making up the loss in trade.

It was also during the colonization period that Spanish contacts with the Navajo were initiated. At first there was confusion about names of the non-Pueblo groups encountered from time to time. It was recognized that the peoples today known as Navajo were speaking a language related to that of the Apaches and so an early term in Spanish reports speaks of the Navajo de Apache. The Navajo called themselves the Dineh, or "the People," (Strawn 1967) a form of self nomination fairly common in hunting cultures.

The Spanish quickly decided that there was little economic value in Navajos other than in their labor. A result of this was that relatively little effort went into the Christianization of the Navajo *in situ* whereas much effort went into capturing men, women and children for use as slaves. Of course the system could work two ways but the number of captives taken by the Navajo was always substantially less (McNitt 1972:18). The Navajo seemed to prefer sheep to Spaniards. The prime significance of the situation was to set the stage for near permanent hostility between the cultures.

The Law of the Indies did not allow slaving but it did sanction the religious education of captives taken in war. With a population of troublesome wild Indians on the frontier, obviously in need of religious education, the Spanish in New Mexico saw ample justification for raids into Navajo country. McNitt sees slavery as the underlying cause of the continuing warfare which the Americans inherited in 1849. The Navajo reciprocated by seizing both Pueblo and Spanish women and children when they could for use as exchanges or simply to keep up their own numbers. Navajo slaves

were often sent far from the frontier because good prices could be had at the mines of Nueva Vizcaya (McNitt 1972:14). Slaving became so popular that Fray Martinez complained, in 1659, that expeditions for slaves often left the settlements bare of defence (*ibid*:15).

One aspect of Navajo life which set them apart from the other wild tribes was the fact that they farmed. This distinction was first noted by Benavides in 1630 (Ayer 1965:40): it was a fact which brought the Navajo close to the Pueblos of the study area to a degree not matched by other wild tribes. After the Pueblo Revolt in 1680 many Pueblos found refuge with the Navajo and passed on numerous culture traits (such as weaving) which remain an important part of Navajo life. A community of interests thus existed which allowed sometime cooperation, something the Pueblos did not seek with other Athapascan speakers.

Precise origins of the Navajo and other Athapascans are not known but it is suspected that they entered the study area from the east having followed the Rocky Mountains down from Canada. Ultimately their origins must lie in Asia from whence all American Indians are thought to have come. They apparently arrived in the Southwest in small numbers at about the time of the first Spanish contacts. The first written account of them comes from Father Geronimo Zarate-Salmeron whose "Relaciones" notes their presence near the upper San Juan at the close of the 16th century (Van Valkenburgh 1974b:205). It is known that a monastery was founded at Santa Clara in 1630 for the conversion of the Navajo and that their raids forced the abandonment of Jemez in 1622 (Amsden 1932:200).

Missionary contact with the Navajo was less frequent than military contact in the colonization period. Some Franciscans were murdered right at their missions by Navajos, or so goes the story told by their Pueblo hosts. At this period it might have been likely that, for example, the Zuni themselves killed the Friar Pedro de Arvilla Ayala and blamed the convenient Navajo. The Zuni did openly murder a missionary in 1632 (Hewett and Fisher 1943:88). In the much cited case of de Arvilla the priest was allegedly dragged from his church at Hawikuh and his brains dashed out with his own bell. The Indians were not without imagination.

Throughout the colonization period the Spanish and Navajo regarded each other as enemies and missed few opportunities to inflict damage. Despite this, the period was one of continued Navajo adoption of things imported by the Spanish and made by the Pueblos. The Navajo have a reputation for being able to select what is useful in another culture and reject that which they do not want (Dobyns and Euler 1972:15; Bailey 1964:218). Lack of this skill by other native American groups contributed to the cultural death of many while the Navajo have grown to be the largest tribe in the United States. Conspicuous among those items selected by the Navajo for cultural borrowing were sheep, horses and goats and the practice of herding these animals. Rejected was Christianity, village habitations and any sort of Spanish control.

Artifacts of native Navajo origin which were in use during this period are well documented from the excavation by Keur (1941) at Big Bead Mesa (Map 23). Besides using Pueblo ceramics the Navajo manufactured both utility and painted wares. The utility wares are distinguished by round to conical bottoms, rough surfaces often marked with corn cobs, coarse temper and thin walls. Their painted wares occurred only sparsely at Big Bead. Designs include black zigzags on a dark red surface which may appear on either the interior or exterior.

Navajo projectile points show a wide range of morphologic variation. Keur speculates that the Navajo did not often manufacture points but rather acquired those of the Pueblos. Hill is cited as having collected myths which attribute all arrow points to non-Navajo (Keur 1941:58). The Big Bead Mesa points are both stemmed and unstemmed. Both expanding and contracting stems were collected; bases are straight, notched or convex. Notching is seen in several variations. In general, workmanship was of a low order but all techniques of flaking and of percussion were used.

Exacerbating frontier problems was the fact that the Navajos never acted as a unified tribe. There were numerous, changing factions and a treaty with one group could not ensure peace with another. Further, aggrieved Spanish or Pueblos seldom made fine distinctions when seeking revenge. If a Navajo caused damage, any Navajo became a target. The whole system of cultural interaction along the frontier was thus

weighted in favor of continuing hostility. As a result, reports of the Spanish government deal continually with campaigns, largely ignoring other aspects of Navajo life (Kluckhohn and Leighton 1962:36).

Material culture of the Pueblos has been described earlier so the following discussion of things used in seventeenth century New Mexico will focus on the objects imported by the Spanish. The mechanism of importation was the mission supply caravan which made the round trip between Mexico and Santa Fe once every three years. The system ran smoothly early in the century bringing needed religious paraphenalia to the friars and returning with salt, hides and other products of the frontier economy. The caravans were the only organized link between New Spain and New Mexico and thus were the occasion for transfers of personnel as well as of goods. A concise explanation of the caravan system is given by Scholes (1930).

In its ideal form, the caravan was outfitted with one wagon for every two friars or a maximum of thirty-three wagons. Much of the cargo was foodstuffs, cloth and other consumables which leave little for the archeologists to discover. There were some durable goods consigned to the friars and some unknown fraction of them may be awaiting the attention of archeologists. Among the most survivable goods sent to each friar and lay brother were metal objects such as horseshoes, spurs, and bridles; and household goods such as needles, awls, and scissors. Nearly a hundred gallons of liquids were sent including sacramental wine, illumination oil and vinegar all of which presumably came in ceramic containers (Hewett and Fisher 1943:96).

The establishment of a new mission, in contrast to normal triennial supplies, required considerably more hardware and specific sacramental objects. Building materials allotted included 4000 nails of assorted size, 800 tacks and another 600 tinned nails earmarked for the church door. Hinges, hook eyes, braces and latches were sent for the doors and windows. A two hundred pound bell and its iron suspension framework was the largest object used in finishing the church. Small items included trumpets, crucifix(es), chalices, candlesticks and other ritual objects. Among the heavy tools for construction work were ten

axes, adzes, hoes and a saw as well as augers and a few planes (*ibid.*:94-95).

High quality, fragile tablewares would not have been imported in any large quantity to New Mexico. There would have been much breakage on the long trip and there were few people rich enough to afford good quality. There were a few pieces of maiolica at missions where they would have been part of the alter furnishings but the amount recoverable at archeological sites will be small (Lister and Lister 1974:38). No maiolica sherds were found in limited tests at San Estevan (Marshall n.d.b.).

During the colonization period the number of missions in New Mexico reached the maximum of about forty, three of which were in the study area. These missions were San Estevan at Acoma (Fig. 11) and La Purisima Concepcion and Nuestra Senora de la Candelaria at the Zuni pueblos of Hawikuh and Alona (Hewett and Fisher 1943:91). Friars met martyrdom in the area on several occasions: two were killed by the Zunis in the 1630s (*ibid.*:88).



Figure 11. San Estevan Rey Mission at Acoma, probably the oldest surviving mission church in New Mexico and one of the least altered (Marshall n.d.b.). The mission is a National Historic Landmark and has been recorded by the Historic American Buildings Survey.

A major economic factor in the colonization period was the introduction of the encomienda system. This institutionalized a reciprocal exchange between the state and individuals in which a man received the

right to collect tribute from a pueblo or larger area in return for instructing the Indians in Christianity and for serving as a kind of National Guard officer (Barber 1932:112). When hostilities threatened, the encomenderos would muster their followers much as an European nobleman would lead vassels to his king's army.

Exploitation of the natives under the encomienda system was but one of several reasons for Indian unrest. Throughout the period there were numerous murders and abortive uprisings by the Indians but the Pueblos lacked a tradition of cooperation which could have united them in war against the Spanish. That is the main explanation of how so few could subjugate so many. In 1651 a friar wrote that there were less than a hundred citizens, i.e., males of even slight Spanish blood (Scholes 1942:6) in the Province.

THE PUEBLO REVOLT (1680-1692)

The small and unsuccessful uprisings against Spanish tyranny after the mid-seventeenth century were schools for revolutionaries. The lessons were well learned by 1680 and the stage was set for the first serious setback to Spanish domination in the New World. The missing element needed to turn rebellion into revolution had been organization and that in turn depended on the emergence of a strong leader. The independent city-states of the various Pueblo linguistic groups had never been able to agree on concerted action whereas the outnumbered Spanish had the required political sophistication to quickly concentrate their power at trouble spots.

With the leadership of a mysterious figure called "Po-pe" the Pueblos had an organizing genius who could make use of the Indian's numerical superiority (Espinosa 1940:14). Although his plan was prematurely set into motion, it was a great success. Extermination of the Spanish was his goal. In the first days of the revolt some 400 Spanish were killed including all who fell into Pueblo hands except for a few of the most attractive women. No missionaries west of the Jemez were known to have survived.

By the end of the first week the Spanish were in full retreat down the Rio Grande and thus out of the focus of this study.

It should be noted that even in retreat the Spanish demonstrated superior organization. A rag-tag stream of 2000 men, women and children, forced to abandon most of their possessions on short notice, the Spanish were burdened with too many hungry mouths and too little transportation. In the face of these obstacles Governor Otermin lead his people in a classic retrograde action through hostile country and a watchful enemy without further serious loss. The two significant factors in Otermin's story are his tactical sense and the failure of the Indians to push for a total victory once they had accomplished the immediate objective of dislodging the Spanish from strongholds. Even Po-pe could not interest the Indians in uniting to kill the Spanish once they had been evicted from the pueblos.

The impact of the Revolution upon the land in the study area could not have been considerable because the number of Spanish west of the Rio Grande was not great. Bandelier notes that, "At Zuni, no mention is made of other victims than the priest, - a proof that there were no settlements in that neighborhood" (1892a:114).

The Spanish came to the study area before the revolt to preach, to gather tribute, or to organize slave raids into Navajo territory - seldom to stay and build. The mission buildings among the Zuni and Acoma would have been obvious targets for the angry Indians but there was little else to destroy. At the missions, the religious paraphernalia was removed and the structure vandalized. Churches at the Zuni pueblos of Alona and Hawikuh were burned in the revolt (Hodge 1937:100): it is less certain that the church at Acoma was destroyed as it is not clear if work undertaken there in 1699 was rebuilding or simply remodeling (Forrest 1929:166).

Po-pe ordered his followers to rid themselves of everything Spanish from their baptismal names and Spanish vocabularies to things of the material world. Only maize and beans were to be planted and all seeds obtained from the Spanish were to be burned. Obeyed in most respects, Po-pe's prejudice against foreign seeds was not generally observed (Hackett 1942b:235).

One conspicuous exception to the general destruction of church goods is credited to the Zuni people. When de Vargas visited

the Zuni during the 1692 reconquest he found them all settled on a high mesa, having abandoned their former pueblos. In one small room was discovered a collection of carefully preserved religious goods including printed books, bells, altar furnishings, etc. (Espinosa 1940:200-203). The Zuni claimed to have saved all these things out of piety but later commentators have voiced suspicion that it was dread of supernatural powers that inspired their restraint (Hodge 1937:104).

The historical record for New Mexico was substantially interrupted by the revolt: the Spanish archive in Santa Fe was destroyed and the record books at all of the missions disappeared. Fortunately, archives in Spain and Mexico contain many documents which originated in New Mexico so not all before 1692 is blank. For the next decade the Pueblos were to be their own masters and the recording of history would largely cease in New Mexico.

There was a brief interlude of historic events following 1680 as a result of Governor Otermin's short-lived attempt to reenter the territory. He interviewed some natives to ascertain the cause of the revolt and the names of its leaders. Although this lay official may have been interested in collecting evidence that it was the policies of the Church which caused discontent and fueled the revolt (Hackett 1942b), he took testimony blaming secular exploitation. It appears that religious issues figured prominently in grievances but that it was civil authority which enforced religious dogma (Hackett 1943a: xxii). Hackett's two volumes (1942a and b) translate all known documents of Otermin's administration for the period following the revolt through 1682.

The revolt was a benchmark in New Mexican history, an event by which others could be dated. As a result, some things which happened before 1680 came to be associated with that date in the minds of the Indians. This leads to a mixture of fact and folklore which has occupied a number of scholars. For example, if all accounts were credited, the number of priests who were killed or who had narrow escapes during the revolt would exceed the number of priests known to have been in New Mexico at the time.

Elsewhere in their New World empire the

Spanish were fundamentally weak. The northern provinces of Mexico, unlike New Mexico, were rich lands with proven gold resources: such possessions more than repaid the expense of subjugating the native population. For a time it appeared that Sonora itself might be lost, along with its mines, in the wake of the Pueblo revolt. This threat was sufficient to require a concentration of resources for the defense of Sonora while New Mexico was left to its own devices. Until Sonora was secure the expatriates from New Mexico would stay in the El Paso (Juarez) area. It was ten years before troops could be spared to reconquer the less valuable farming lands of New Mexico.

Athapascan raids had figured so large in Spanish fears that they felt that the absence of Spanish arms would result in massive raids against the Pueblos. If that happened, they reasoned, the Pueblos would soon see the value of Spanish protection and welcome back the old order. It was in this frame of mind that Governor Otermin mustered some 200 soldiers and Indian allies for a trip back up the river in 1681. The only tangible result was the interviews mentioned above. He stopped short of Santa Fe because he found increasing numbers of hostile Indians on every side and feared that to go further was to invite disaster. Further, he found that the Apaches and Pueblos were united (Forbes 1960:186).

Perhaps the most fortunate event, from the Spanish perspective, of the decade of freedom was the emergence of the revolutionary leadership as tyrants in their own right. Even taking into account the propensity of the Spanish to exaggerate the evil time which befell the apostates, it seems that the Pueblos had more than a fair share of hard luck between 1680 and 1690. Draughts compounded civil wars and both the Apaches and Utes took advantage of the situation to resume raiding. Otermin's forlorn expectations of 1681 became reality for Don Diego de Vargas who retook New Mexico with little opposition in 1692 (Bancroft 1890).

SPANISH COLONIAL PERIOD (1692-1821)

The Spanish Colonial period is marked by several changes in the strategy for exploitation of the land and Indians.

Prior to the revolt, land use had followed a pattern of exploitation by the missions' use of Indian labor and by encomiendas/haciendas which had both land rights and title rights. These large and wealthy units were de-emphasized after the reconquest in favor of smaller farming units settled by Hispanics. Immigration was encouraged on a larger scale than before and those who responded were expected to earn their own bread rather than depend on Indian labor.

The reasons behind the new strategy may be found in affairs outside of New Mexico's boundaries. Spain's position as leading world power was being challenged and eroded. French incursions were seen as threatening and the Indian menace posed by the various "wild" tribes was always great. Planting a larger friendly population in New Mexico could place a barrier between these forces and the more vital properties in Mexico. Northern Mexico contained mines which more than repaid their cost but New Mexico was largely a sink into which money had to be poured. As a buffer it could serve to protect the more valuable interior.

Inside New Mexico, the decrease in numbers of settled Indians was another argument in favor of importing labor. From an estimated 30,000 Indians at the time of the revolt, their numbers dropped to around 10,000 in the closing decades of the 18th century (Twitchell 1911:I, 455). The population of Pueblo Indians further diminished to about 8000 in the 1800s. The number of their town sites dropped to a third of the 60 originally captured by the Spanish (Meinig 1971:13). (If there were no more Christians after 200 years of missionary work, at least there were far fewer heathen than in 1600.) In the study area, the major pueblos of Zuni and Acoma survived.

Mestizos blended their ancestral traditions with elements of Spanish culture such as language, religion, dress and animal husbandry. By 1800 most of the 20,000 "Spanish" in New Mexico were mestizo with a cultural tradition which would become known as "Hispanic" (Meinig 1971:14).

Land grants of this period were for both individually held lands and for lands held in common, much of which was used for grazing. Herding of sheep became more important as a market developed for wool

but meat was also an important commodity and the New Mexico sheep, first the churro and then the merino, evolved with the twin admirable qualities of being both tasty and capable of walking the long trail to market (Kupper 1945:19).

In the eighteenth century the typical settlement pattern of the Hispanics had become one of ranchos, small farms, scattered along drainages rather than concentrations of people as had been the case with the older hacienda pattern. Simmons (1969:11) attributes this change to the increasing numbers of settlers whose need for farm lands forced them to align themselves in conformity with the availability of water.

Ranchos were the smallest unit of settlement. These were located close to their farm lands and generally supported one family. Often, the rancho was selected informally by the settlers without government sanction and thus go unrecorded in formal histories. Those officially granted in 1793 at Ojo Caliente were 150 varas (a vara equals about one yard) wide and extended perpendicular to a stream for up to a mile. Loose associations of ranchos were termed poblaciones. If the settlers chose to build their homes together as a small fort, the term plaza applied (Simmons 1969:13).

Economic necessity may have been the force which drove the settlers to live in a way which made defense difficult: the linear patterns of arable lands simply did not encourage farmers to cluster their homes. However, it seems that defense should have had a higher priority in land use planning for events proved that the threat of hostile Indians was to force the evacuation of many ranchos. Graphic proof of this may be seen in the famous 1758 map of Don Bernardo de Miera y Pacheco, which indicates that about half of the named dwelling places in New Mexico were unoccupied (Kessell 1979: 510), and that the study area had no settlements of Spaniards at that time. A later map (1779) by the same author shows a number of settlements along the Rio Puerco and the notation by others that they had been destroyed by attacks. Stewart cites attempts to resettle the area in 1818-1821, 1826-1834, and in the 1870s (n.d.:197).

Cebolleta is an interesting example of the hazards of frontier life. This plaza was established in 1800 but even earlier had

been the site of an aborted plan to settle some Navajo. Navajo had been in the Mount Taylor region previously and so the efforts to make a permanent home for some of them here seemed natural. Their mission site (Map 2) was selected in 1748 but was short-lived due to the failure of the church to deliver promised supplies (McNitt 1972:28).

Although the Navajo mission had failed, the Indians used the area for their herds. Establishment of Cebolleta (Fig. 12) was thus seen as an infringement of traditional Navajo land rights. Raids on the young settlement reached a peak in 1804 when a large party of Indians overran its defenses. A still larger raid a few months later was repulsed only due to the presence of a detachment of soldiers sent to reinforce the settlers (Stewart n.d.:203).



Figure 12. Ruins at Cebolleta

Alarms continued regularly at Cebolleta during the following decades. The men of the village built a reputation as Indian fighters and participated in many punitive campaigns directed against the Navajo. In 1850 one such group was wiped out when, at the conclusion of a march and nearing home, they allowed their camp to be surprised (Simmons 1971:26).

Cebolleta has remained a small village, largely limited in growth by the small supply of water available. Today, houses are separated but ruins can still be seen of the fortress-like construction used in the earliest settlement.

Despite continued interest in the area, the Navajo were forced to formally relinquish claim to the Cebolleta area in a treaty concluded in 1805. Subsequently some Navajo, wishing to end the constant warfare with the government, made a separate peace and settled east of Laguna. These became known as the Canoncito Navajo to the Hispanics and as the Dine Ana'aai, Enemy Navajo, to their former tribesmen (Stewart n.d.:204). At one point the leader of the Dine Ana'aai was appointed general of all the Navajo, a post which could have had significance only to the Spanish, but these Navajo were generally little trusted by either side (McNitt 1972:50).

Land grants, the assignment of certain degrees of land use rights, have been a problem in New Mexico from earliest times through this century. The study area has not been exempt from these problems. In intent, the land grants were made to protect interests of people who either traditionally used certain lands or who were being rewarded for making productive use of lands which had previously been unusable.

Among the oldest continuous land grants are those made to the Pueblos. These reserved for exclusive Indian use the land surrounding each pueblo in accordance with traditional use. In practice, the needs of a growing Hispanic population, along with simple greed, lead to innumerable conflicts between established grants and various land grabbers.

Within the study area there occurred one of the more notorious cases of encroachment. Prime villains of the piece were the Baca family, leading political figures in the Laguna area. A grant made to them in 1768, for grazing rights as opposed to fee simple rights, established a claim of sorts to the area but apparently was never exercised until the Americans quieted the Indians. Jenkins cites several sources which indicate that the Encinal/Cubero area was in use by the Laguna and Navajo rather than by the Bacas (1971:99), although Bacas continued to claim these lands until 1939.

The farm lands of Cebolleta had been used by Laguna but this did not prevent the grant of that land to Hispanics in 1800. However, lands to the south of Cebolleta which were clearly covered by the Laguna grant were initially protected. As the power of central government declined at the

end of the Spanish period and throughout the Mexican period of rule, trespass on the Indian's lands became more common. The issues became so tangled that many claims were not settled until considered by the Pueblo Lands Board in this century (*op. cit.*).

Histories of the colonial period dwell at length on the quarrels between the secular and religious leadership. In 1767 an event occurred which tipped the balance of power in favor of the Governor, secularization of the missions at Santa Fe, Santa Cruz, and Albuquerque. This event marked the beginning of the end for the 28 New Mexico missions and their conversion into regular parishes, a process which was completed in 1798. One of the reasons given for the shift from mission to parish organization was the growth of the Hispanic element and a decrease in need to make conversions.

Another topic which frequently arises in records of the Colonial period relates to continual hostility of various Indian tribes. A picture emerges of a kind of balance of forces with the Spanish seldom being confronted by universal hostility yet seldom enjoying secure peace. The Pueblo tribes were quiet after the close of the seventeenth century, having had their fill of abortive revolts which gained them no long-term benefit. This could have been of but small comfort to the government since Navajo, Apaches, Utes and Comanches, alone or in shifting combinations, were able to keep Spanish military efforts overextended.

Little was accomplished by the Spanish in the eighteenth century in New Mexico. The constant wars with the wild tribes drained both men and money. The missions seemed to make little progress in winning the hearts of the Indians. A long succession of governors, at approximately five year intervals, resulted in a series of prosecutions of retired governors by their successors. Perhaps the only area in which positive accomplishments were scored was in the growth of the population and the attendant increase in the number of towns. In the study area there were a handful of new names on the map.

Until the end of the Colonial period the firearm in use would have used flintlock technology. Very little physical evidence of their use has been found; Spanish flintlocks exist today in the Southwest in

relatively few museum specimens but some gunflints have been found in archeological context (e.g., Biella and Chapman 1977). Additional finds of gun parts and flints (whose nation of origin can often be identified) will certainly be studied carefully for further evidence of French influence in the area. Distribution of the weapons at pueblo sites might also be studied to determine the rate of native acceptance of this new idea. Since many Spanish were armed with weapons other than firearms it may be found that the Indians were in no great hurry to adopt this new technology.

MEXICAN PERIOD (1821-1846)

The brief period of Mexican rule of New Mexico, beginning with the Treaty of Cordoba, was not well documented in official records. During this time,

no books of any consequence relative to events in New Mexico were published. The Santa Fe Archives are quite voluminous but fail to give much light on the events of the period (Twitchell 1963:ii, ix).

The primary political event of this period, severance of ties with Spain, will be difficult to detect in the archeological record because few material goods had been imported from Spain previously. Trade with Mexico continued but was soon subordinated to the importance of growing commerce with the United States.

For the future of New Mexico, perhaps the most important decision of the Republic of Mexico was to allow open trade with the United States. This had been prohibited by Spanish governments because of the well founded fear that increased knowledge of the area would whet the expansionist appetite of the U.S. Also, there was no desire to share trade profits.

Before 1821 the preponderance of trade was conducted along the north-south axis known as the Chihuahua Trail. Along that route New Mexico's goods traveled south in yearly caravans to help supply the mining communities of northern Mexico. In return there were limited amounts of very expensive manufactured goods to carry back to Santa Fe. Under Mexican rule it was perceived that advantages of access to

relatively inexpensive industrial goods from the U.S. outweighed the old political considerations. The opening of a large potential market appealed to traders on both sides of the border and by 1843 half of the trade along the Santa Fe Trail was being conducted by native New Mexicans.

Due to the new trade relationships, archeological sites dating after 1821 should reflect growing dependence on American-made items. The actual amount of goods, in terms of individual artifacts, is difficult to estimate. It is known that the cash value of goods carried to Santa Fe by Americans in 1843 was almost a half million dollars (Gregg 1954:332).

The western limit of Mexican occupation of the study area at this time was marked by the villages of Cubero and San Mateo (Map 2) founded in 1833. Of the two towns, Cubero was more in the main stream and often served as a gathering place for travelers using the 35th parallel route to the west (Stewart n.d.:225).

This was not a particularly happy time for the government of New Mexico. Taxes were difficult to raise locally yet the central government could not support Santa Fe. In fact, there did not appear to be a great deal of interest in the area. In accordance with the treaty of 1821, all laws continued in effect and all officials continued in their offices. As in the past, real power continued to be exercised by the strong. Since illiteracy was common it is not surprising that few legal records were made or that custom, rather than legislation, most often ruled an alcalde's decisions (Twitchell 1963:II, 13).

Revolutionaries were active throughout Mexico at this time. With revolution from within and threats of invasion from first Texas and then from the United States, governors of New Mexico were successively killed, disgraced, or persuaded to resign. Indians continued their depredations and the Hispanics continued to make slave raids into Navajo country. With such a disheartening background it is understandable that Governor Armijo discarded his plans to resist the American invasion (Emmett 1965: 36). So it was that, on August 12, 1846, Colonel Kearney rode unopposed into the capital to accept the surrender of New Mexico.

AMERICAN PERIOD (post 1846)

Introduction

Nineteenth century New Mexico became a melting pot of cultures and subcultures on a scale not seen since the original Spanish invasion. Proceeding at different rates in different regions and with a cast of characters which was even more variable, a whole new social geography was in formation. The oldest residents of the area could be categorized as mainly Hispanic or Indian. The newcomers were broadly lumped as Anglos. The whole southwest was becoming the focus of several migration patterns which resulted from mainly economic factors.

From Texas there came an inexorable push of cattlemen seeking new range and assuming that the low population density of New Mexico signified that the land was unused. Farmers swelling out of Oklahoma made the same assumptions about the seemingly vacant lands they found in northeast New Mexico. Californians began to move east in search of new opportunity as the gold fields lost their attraction, and Mormons began setting up their exclusive little settlements in backwaters communicating only with Utah. Mixed into the whole area were Jewish merchants who had followed first the Army and then the railroads to set up shop wherever opportunity allowed. Binding all together was the railroad which provided two east to west lines of communication through an area which for centuries had mainly thought in terms of north to south movement.

As in all of the American Southwest, the U.S. Army played a major role in the history of the study area after 1846. Its influence went beyond purely military matters into such areas as survey (Goetzmann 1959) and social change (Miller 1979). When the United States fell heir to New Mexico it inherited several hundred years of unsolved problems which often found expression in violence. It became the prime function of the U.S. Army to find a final solution to the Indian problem, one which had multiple causes and expressions but which was seen as reducible to the one issue of imposing peace on the land (Keleher 1952:286).

The traditional hostility of Athapascans

Hispanic-Pueblo had been reduced in the nineteenth century to the simpler equation of the Athapascans versus everybody else. The Americans were lumped with the "everybody elses" when it became known that the defeated Hispanics were now to be treated as U.S. citizens. This was a fact of life that came to have more significance for American military decisions than did the attitudes of the Pueblos and Hispanics.

The Mexican War

U.S. military presence as an effective force in New Mexico begins with the onset of the Mexican War of 1846-1847. Colonel Stephen Kearney marched from Fort Leavenworth to Santa Fe with infantry, cavalry, dragoons and artillery to seize Mexico's northern province for the Union. His orders were to take possession of Santa Fe, establish a civil government, ensure continued trade with the U.S. and then proceed to California (Loyola 1939: 59). This mission, based on the territorial claims of Texas, was speedily accomplished since the forces of Governor Armijo chose not to resist the invasion. The easily won victory perhaps gave the Americans a misimpression of the actual hostility toward them and the grassroots opposition to their occupation. A bloody rebellion (1847) in which both Pueblos and Hispanics happily slaughtered Americans - including Governor Bent - revealed the true situation (Bancroft 1890:432). However, the events of this war took place mainly outside the study area and merit little mention here.

Thinking that all was secure in the occupied territory, Kearney marched southwest, past the focus of this study, with the intent of carrying the war to California. He had hardly started when he encountered Kit Carson who carried news that California was already taken, information which persuaded Kearney to send most of his dragoons back to Santa Fe and push on with a much reduced force. This decision, prompted by a desire to leave a strong force to chase New Mexico's Indians, proved nearly disastrous when he later found California's welcome very hot indeed. Another decision important to history was that he soon elected to abandon his wagons to allow him to push on more quickly to California (Emory 1951:80). Thus, his commission to carve out a wagon road from New Mexico to

California was delegated to Colonel Cooke and his Mormon Battalion (Clarke 1961:180). The Mormon road was marked out well south of the study area.

The route followed by Kearney as he marched to California began by heading south along the old Chihuahua Trail, leaving the river near the site of Elephant Butte Dam. Before heading west Kearney had dispatched some troops to attempt punishment of Navajo who had attacked towns by the river. This was the first (and ineffective) American attempt to bring the Athapascans to reign (Emory 1951:84). Following this, moving away from further involvement with the study area, Kearney continued through southwestern New Mexico on a trip described as remarkable only for its "absence of remarkable events" (Clarke 1961:181).

One result of the Mexican War was to strip from Mexico almost half of its total area. The United States gained title to the present states of New Mexico, Arizona and California as well as portions of other states. This caused no great economic disruption in Mexico at the time because the lost territory had made little contribution to the national economy. Histories of Mexico (e.g., Bazant 1977) pay scant attention to aspects of the war which took place outside the modern boundaries of Mexico. Many Americans rated the value of the conquered territory no higher until reports of the Topographic Engineers highlighted its assets (Calvin 1951:16).

Another consequence of the Mexican War was to put the United States in the role of protector of the inhabitants of New Mexico from the raids of the nomadic tribes. In the study area this responsibility mainly meant keeping the Navajo under control, a task which was to occupy the attentions of several generals over the next quarter century. The first step taken in this direction was to send punitive expeditions into Navajo country in response to raiding but in 1849 a military post was established at Cebolleta by Company K, Second Dragoons (McNitt 1972:157).

Indian Wars

Within the study area the wars between the U.S. Army and Indians were primarily fought against the Navajo although Apaches were sometimes seen in the area and Utes were

traditional Navajo foes who sometimes came south on raids. It was the consistent policy of every military commander of the 9th Department (New Mexico) to bring a halt to depredations of the wild Indians. Tactics used varied over a half century with the dictates of Washington and the inclinations of the field commanders. Among the policies followed were reprisal (McNitt 1972:376), containment (Kelly 1970:52), extinction (Keleher 1952:157), appeasement (Young 1978:29) and diplomacy, the latter being remembered in a series of short-lived treaties. None of the policies alone either worked or failed completely with all tribes in all places. The Indians were a people with many variations and so there were almost always some who would pick the war options while others of their tribe, and other whole tribes, were seeking peace.

In one early lesson on the complexities of Indian politics the Army had almost persuaded the Utes to end their wars with the Cheyennes when the word came that the latter had war parties on the trail to Ute country (Keleher 1952:92). Even within one tribe there were marked differences. For example, the Dine Ana'aai, had settled near Laguna and regularly served as scouts against other Navajo (McNitt 1972:300). At times the Army was able to quiet substantial majorities of a tribe while still being annoyed by small groups of warriors who, under a charismatic leader such as Mangus Colorado, could make the frontier a very hostile place.

Much has already been written about the Indian wars. It would be easy to say too much here, but we can not lightly dismiss the event which is often cited as the most traumatic event of Navajo history. The events leading up to the military defeat of the Navajo, and their subsequent "Long Walk" into imprisonment, will be briefly outlined. The pivotal event may have been the decision by General Carleton to order the start of the campaign which took Kit Carson into Navajo country in 1863. Carleton's General Order 15 lead to Carson's deep penetration of the Canyon de Chelly, where the command destroyed Navajo food and food production areas.

When Carson subsequently returned to the field in 1864 he found the Indians weakened by the harsh winter and shortages of food. Apparently a critical factor which prompted

surrender by the Navajo, after almost two centuries of war, was Carson's ability to convince them that the policy of extermination had ended and that they were to be safely transported to a reservation (Kelly 1970:x).

In six major convoys the Navajos were sent to Bosque Redondo until more than 8,000 had been gathered there. The alien environment at this reservation offered few comforts and so, by 1865, the defections of those at Bosque Redondo more than off-set the numbers of late-comers arriving (op. cit. 163). Finally, in 1868, a treaty was signed which allowed the Navajos to return to a portion of their homeland, a reservation which was destined to grow dramatically over the next century.

Aside from the impact on spiritual values caused by removal from their sacred areas, the Navajo also suffered great economic loss. From a state of relative prosperity based on herding, they were reduced to dependence on the government dole. Many of the Dine had died of illnesses contracted on the Long Walk, but all had lost the major portion of their wealth in horses and sheep (Bailey 1964:166). The treaty of 1868 recognized this loss and specifically provided funds for rebuilding the herds.

The Civil War

New Mexico was a battle ground during the Civil War only because it was a gateway, or buffer, between more strategic areas held by the adversaries. Some of New Mexico's native sons were drawn into the fray, some serving with great distinction, but the period of active warfare was of short duration. The few important battles (Fort Craig, or Valverde, and Glorieta Pass) were fought outside of the study area. Confederate forces under Sibley had marched north out of Texas: Union forces from Fort Union, reinforced by volunteers from Colorado, eventually halted the rebels at Glorieta Pass and then harried the retreating Confederates as they attempted to return to Texas via the Rio Grande (Sanders 1961:26). Thus, all the major actions of this war took place to the east of the study area.

Many U.S. Army officers stationed in New Mexico resigned their commissions at the start of the war and fought with the

rebels. Among those was General Sibley who lead the invasion of New Mexico in 1862. He had superintended the construction of Fort Union and was well aware of the treasure of war materials it contained, sent there with great foresight by Secretary of War Floyd before he too went south.

In July of 1861 all U.S. military posts in the lower Rio Grande valley were lost to the Confederates except Fort Craig. Colonel Canby gathered his Union troops at that fort in the first serious effort to repel the invasion. Known as the Battle of Valverde, some 3000 Confederates engaged about 4000 Union troops on the east bank of the Rio Grande above Fort Craig. The Union force included in its numbers portions of five regiments of New Mexico volunteers and about 1000 militia. The field was lost to the rebels, apparently because the New Mexico volunteers and militia fought with little enthusiasm: at least that view seems supported by the fact that a clear majority of Union casualties were among the few regulars and Colorado volunteers. Fort Craig, however, could not be taken or its defenders dislodged so it was simply bypassed and the rebels pushed north.

The failure of the native New Mexicans to distinguish themselves was probably due to lack of dedication to a government which had been the enemy less than twenty years before: most New Mexicans were still apathetic about the Union. Also, Texans, the bulk of the Confederate troops, had a bad reputation in New Mexico and may have been feared more than the New Mexican officers. The inspector-general of New Mexico reported that the native troops were "worse than worthless; they are really aids to the enemy, who catch them, take their arms and tell them to go home" (Whitford 1971:69). Canby, on hearing that a number of New Mexicans had deserted at Valverde, quipped that it "adds to rather than diminishes our strength" (Kerby 1958:75). If the people did not take to the military life neither did they care much for the rebels: the popular uprising which Sibley and others had expected failed to materialize. Neither were disaffected Union officers able to persuade their private soldiers to quit the Union (Whitford 1971:32).

It was a need for supplies which finally brought the war into the study area. The rebels had pushed north through the valley

of the Rio Grande and captured Albuquerque without resistance but also without gain, for the retreating Federal forces burned all that they could not carry (U.S. War Department 1961b:137). This, and the cool reception from the citizens, forced the Confederates to forage for necessities. All supplies of food, forage and clothing were seized for the army from places as far west as Cubero (Whitford 1971:72).

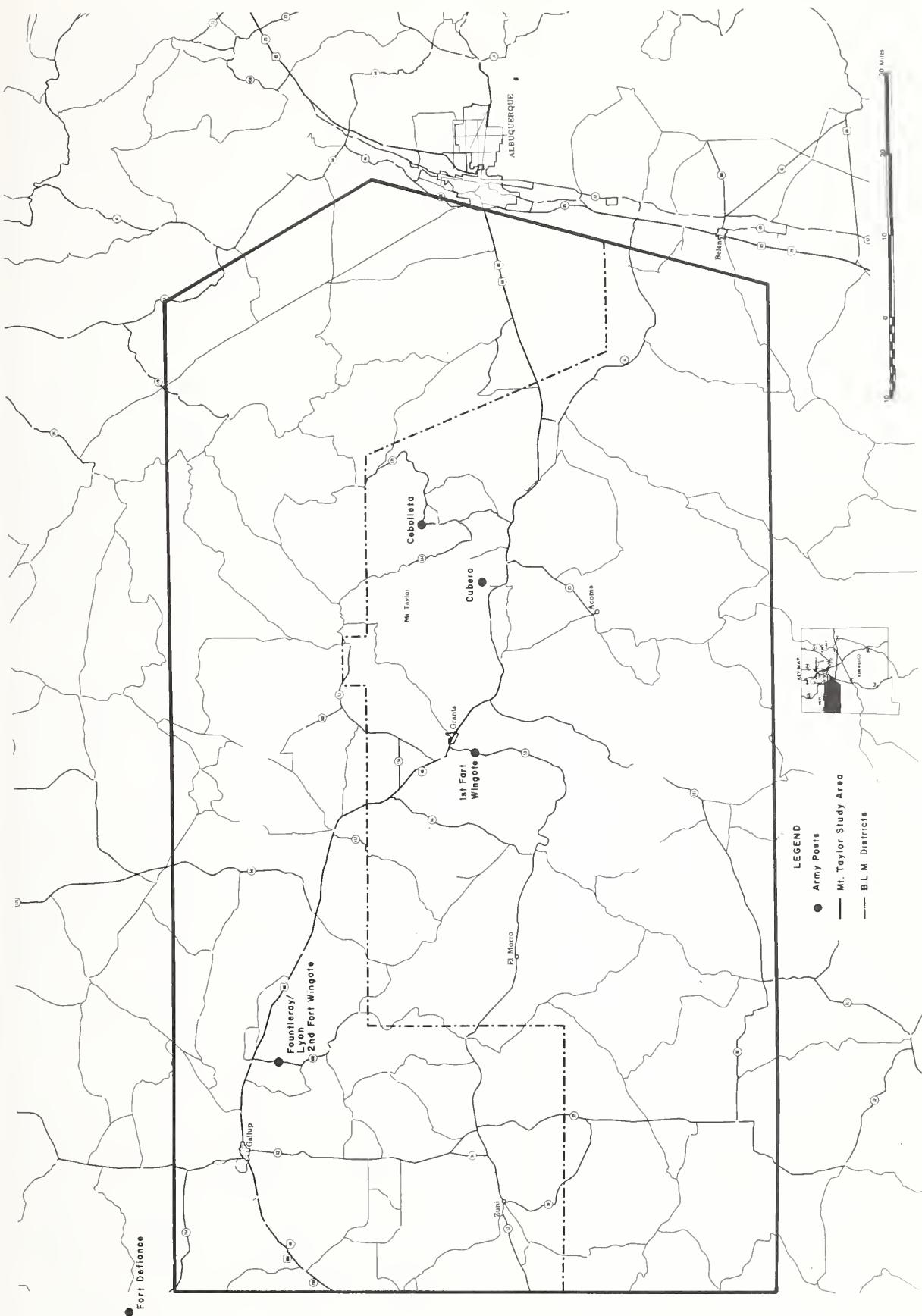
The battle for Cubero was conducted on March 3, 1861 and ended in bloodless victory for the South. "Battle" is perhaps too glorious a word for what took place at Cubero. Dr. Kavenaugh and three other southern sympathizers demanded that the garrison surrender. Without a shot having been fired the Union force (mostly comprised of New Mexicans) turned their guns over to the doctor and were then sent to Albuquerque as prisoners. The small post at Cubero was taken over by Captain Thurmond, C.S.A., and 25 men who were able to confiscate several thousand dollars worth of military supplies there (U.S. War Department 1961a:172-173). Aside from this incident, and the supplies harvested by rebel foragers, the study area played no further role in military aspects of the Civil War.

Military Posts

A description of the military posts (Map 24) used by the Americans in the study area is made more difficult by the fact that some locations were used with more than one name and one post was in several locations. One reason for the frequent changes is that the purpose of the various forts was to control the Navajo and any fort was only useful to the extent that it was near Indians. As the Navajo shifted the locus of their activities so, too, the Army moved.

The two oldest posts connected with the study area are those of Cebolleta and Defiance, the latter actually being in Arizona but an integral part of the history of the study area. Cebolleta is the oldest by less than a year and was established in the town of the same name in 1850. It was manned through 1851 and then abandoned although the buildings, rented quarters, were maintained for another ten years. The site had been selected as defensible and because the town was often the scene of

Map 24. Military Posts Used During The American Period.



Navajo attacks on Mexican residents (Simmons 1971:32).

During its short life Cebolleta was home to companies of the 2nd Dragoons and the 3rd Infantry (Agnew 1971:7). Perhaps the most interesting event at the post occurred in 1850 when Captain Ker simply rode off into the sunset with his dragoons, apparently to escort a whiskey shipment down the Gila River. His desertion went unpunished, partly because there were not enough spare officers to conduct a court-martial (McNitt 1972:161). In any event, it was decided to move troops closer to the Navajo power base so Fort Defiance was established in 1851 and Cebolleta's troops were moved there.

Fort Defiance was well-built of logs and mud with some stone store houses. It was located about in the middle of country controlled by the Navajo and was called by General Mansfield, "the most beautiful and interesting post as a whole in New Mexico" (Frazer 1963:22). It figured prominently in government efforts to control the Navajo, perhaps most conspicuously in 1863 when (under its new name of Fort Canby) it was a jumping off place for Kit Carson's famous expedition which broke Navajo resistance (McNitt 1972:417).

The post had been abandoned in 1861 after ten years of service because the Civil War had created new priorities for troop placement. The soldiers at Fort Defiance were withdrawn and participated in engagements with the Confederates along the Rio Grande. The structures at Fort Defiance were abandoned and were used only by the Navajo for the next two years. During the peak years of its life, Fort Defiance saw wide fluctuations in the numbers of troops and other men who used its facilities. Designed for a regular complement of about 200 defenders, it reached a maximum in 1858 when over a thousand troops and several hundred civilians sheltered there during a war scare (McNitt 1972:360).

Fort Defiance was disliked by the Navajo on at least two counts: it was sited in the heart of their homeland where it could easily bring military pressure on them, and its herds had appropriated many acres of fine grazing lands. The post's herds were a frequent target of raids but the guards usually prevented theft.

Some of the hottest work of the garrison

took place in early January, 1861 when the Navajo attempted to overrun Fort Defiance. This attack was staged by about 1,000 Indians who outnumbered the soldiers approximately five to one but who were comparatively poorly armed. The two-hour long attack, mostly in darkness, may have been one of the few battles to approach the scale of a Hollywood war. The Indians managed to seize some of the fort's buildings, but could not keep them. With dawn the attackers had to withdraw having inflicted but a few casualties at the cost of a dozen or more deaths (McNitt 1972:382).

Fort Fauntleroy, another post but briefly occupied, was a satellite of Fort Defiance. Located at Bear Spring, Ojo del Oso, about 35 miles southeast of Fort Defiance, it took over the duties of that fort in 1861. The post had been named for an officer who resigned to join the Confederacy, thus the post was rechristened Fort Lyon. Though brief, the post had a sordid history for it was here that a massacre of Navajo took place following a dispute over a horse race (Hart 1967).

The most important military establishment in the study area was, and remains today, Fort Wingate. Founded in 1862 at Ojo del Gallo, the new location was developed by New Mexico Volunteers who built a stockade almost a mile in total length. A prime function of this site was to serve as a way station on the Navajo Long Walk in 1863. Provisions of the Navajo Treaty of 1868 required that the fort be resited and the old location of Forts Lyon/Fauntleroy was selected although it was 1870 before any permanent buildings were erected. (Hart 1967:142). It is probably due to this reuse of the site that no trace of the original post is known. Fort Wingate was largely dismantled for use in other buildings in the countryside and its land taken for farming (Fitzpatrick n.d., 15).

The buildings erected for the second Fort Wingate eventually became the Wingate Indian School and became the responsibility of the Indian Bureau after 1925. The present Fort Wingate, now officially known as the Army Depot, has modern buildings which replaced the old adobe buildings around 1960 (Hart 1967:141).

Fitzpatrick's paper (n.d.) presents an interesting anecdote of life at Fort Wingate. For example, in 1882, the fort

was a base for archeological and ethnological expeditions, and a Fifth Cavalry patrol to Fort Defiance in 1907 was the last United States Army expedition to be directed against the Indians. The fort was deactivated between 1911 and 1918 except for a short time in 1914 when it served as a stockade used to detain some 4,000 Mexicans, refugees. In its final reincarnation Fort Wingate became the storage point for one of the world's largest collections of munitions. After World War II there were as many as 10 million pounds of TNT stored, mostly uneventfully, at the fort.

Exploration and Survey

The role of the military in exploration of the West was basic to developing an understanding of the problems and promise of the area. Zebulon Pike had brought early intelligence reports to Washington regarding the condition of Spanish garrisons in New Mexico as well as geographical data (Twitchell 1963:I,464). Once the land was occupied by the Army the pace of exploration accelerated and was to continue to make important contributions throughout the early American period.

The short lived Corps of Topographic Engineers figures prominently in much of the early work. Lieutenants Peck and Abert were left by Kearney in New Mexico for the purpose of mapping the whole conquered region (Emory 1951:75). This enormous task could not be accomplished in any great detail in the short time allotted. Nevertheless, their report, submitted to the Senate in 1848, advanced the level of knowledge regarding the population, political organization, resources and topography of New Mexico (Goetzman 1959:147).

Lieutenant Edward Beale was another early Army pioneer in New Mexico although his name is remembered best for the famous camel experiment. He was to explore a wagon road route westward to the Colorado River but his trip was also to be a test of the suitability of camels for transportation in the Southwest. In 1857 his curious command set out from Albuquerque along the 35th parallel. The distance from Albuquerque to Fort Defiance was already so well known that little note was taken of the early stages of his trip. Leaving Zuni, the real work of his expedition began

except that the camel had already been shown to be reliable in this country (Faulk 1976:108).

Beale's party was equiped well for the wagon route survey having a dozen wagons and over a hundred animals in addition to the camels. The camels proved so useful to Beale's men that he claimed, "There is not one of them who would not prefer the most indifferent of our camels to four of our best mules" (Fowler 1950:62). In spite of such praise, camels did not gain wide acceptance, perhaps because the onset of the Civil War left no time for camel experiments but more likely because the railroads deprived camels of a role in transport across the American deserts. The few dozen camels imported by the Army were sold to civilians who little appreciated their talents. They allowed them to die or simply wander off and become the making of desert legends.

Observations made by Lieutenant James Simpson in 1849 added much to the fields of both geography and anthropology. Simpson was attached to Colonel Washington's command which invaded Navajo country on a punitive expedition. During the march Simpson made the grand tour of northwestern New Mexico going through Chaco Canyon, west to Canyon de Chelly and then returning by way of Zuni and Inscription Rock. His party made accurate drawings of Pueblo Pintado and nine other ruined towns in the upper reaches of the Chaco River and thus became the first to describe Pueblo archeological sites (Goetzman 1959:240). Perhaps most important from the historian's perspective was Simpson's recording of Inscription Rock where all visible information was faithfully copied, thus preserving data which are no longer available at the site (*ibid*:243). His party left the first inscription in English on the rock (Carson 1967:26). He is also responsible for renaming a mountain after President Taylor and so, indirectly, for the name of a Forest District and the title of this study (Stewart 1979:213).

Another survey of the study area was that of Captain Lorenzo Sitgreaves. He was following up rumors reported by Simpson that mountain men knew of a route suitable for a wagon road between Zuni and California. In 1851 his expedition departed Zuni and followed the Zuni River down to the Colorado. Portions of his

route in Arizona are today followed by the Santa Fe Railroad (*ibid.*:246) but no particular benefit came from the short portion of his survey in New Mexico.

Lieutenant Amiel Whipple visited the study area with a well-equipped survey party in 1853. His was to be a search along the 35th parallel for a suitable railroad route. This was considered an important mission because a route along that latitude could attract support as a compromise between some Northern and Southern interests which sought maximum political benefits from a railroad. Whipple was particularly interested in the area between the Zuni villages and the Colorado River because the route from Zuni to the east was already well known. His most important work was done in the vicinity of Bill Williams Fork, Arizona, outside of the focus of this study (Goetzman 1959:288).

Railroads

It would be difficult to over-estimate the importance of the railroad in the study area. As we have seen, the population of the study area had been rather low throughout its history. The choice of a route through the area for a transcontinental railroad brought a minor flood of people, many of whom stayed beyond the initial construction period boom. Several camps which had been born to serve the construction gangs managed to become permanent towns and served as a nucleus for further growth and development of the area's resources.

The beginnings of railroading in the study area might be traced to an 1866 Act of Congress which gave birth to a route along the 35th parallel and to the Atlantic and Pacific Company (*Statutes-at-Large*, XIV, 292). The generous provisions of this Act allowed vast areas to be claimed by the railroad as inducement to build. In New Mexico, land was to be granted in alternate, odd numbered sections throughout the zone extending to 40 miles on either side of the right of way. To compensate for sections already sold or otherwise committed within these "place limits," additional sections could be selected from another zone ten miles wide on either side of the place limits. This "indemnity strip," as well as the place limit lands, were all to be withdrawn from entry once

the odd numbered sections had been identified by survey and, later, conveyed to the Atlantic and Pacific as increments of twenty five miles of track were completed.

The history of the corporate successes and failures tied to the building of the 35th parallel route is complex. In 1872 the Secretary of Interior accepted the line's definite location map and withdrew from entry by others the entire area of the A&P's land grant (Greever 1957:165). The future of the company was not as secure as its land grant for several other lines coveted its route and maneuvered to gain control of the A&P. After a series of deals and mergers too convoluted to inspect here, the route through the study area became the prize of the Atchison Topeka and Santa Fe Railroad in 1897 (Myrick 1970:34).

Track laying began at Isleta in 1880 and the last spike was driven to complete the 35th parallel transcontinental line in 1883. In between those dates the study area saw the construction of shanty towns built for temporary service at the end of track. A few towns have lasted to the present: all of the largest towns in the study area today are near the railroad. Coolidge (Map 25) was named for a railroad president. Grants was named for the brothers who contracted to build much of the line. Gallup got its name from a paymaster of the A&P (*op. cit.*:34). Coolidge was once threatened with destruction by railroad crews angry over the theft of some beer: troops from Fort Wingate prevented that breach of the peace but the town burned down in 1890 (Hart 1967:142).

Several minor lines also constructed railroads through the study area (Fig. 13). These were built with an eye to extracting specific resources. The Mitchell Brothers Company pioneered railroad lumbering in the Zuni Mountains, taking advantage of the virgin stands made accessible by completion of the A&P. Between 1890 and the 1930s, under various company names, loggers slowly pushed forward and harvested ever larger tracts of the A&P's timbered grant. Some of these short lines were built to narrow gauge but the advantage of being able to switch loaded cars to the A&P main line resulted in a change to standard gauge after 1900. Several new towns (Fig. 14) came into being as an effect of the logging: Mitchell (now Thoreau) began as a



Figure 13. An abandoned railroad grade in the Zuni Mountains.



Figure 14. Ruined cabins at Valle Largo, a logging town in the Zuni Mountains.

logging station, Kettner, Sawyer, McGaffey and others were tied to the forest resource (Myrick 1970). All of the rails were removed from the Zuni Mountains during the scrap drives of World War II. Today the rights of way can still be traced through the mountains and occasionally one will find a deep cut or fill which adds a bit of substance to memories of the long-silent locomotives. Forest Service files contain a map by J. P. Hereford, drafted in 1969, which shows all of the logging railroads in the Zuni Mountains (Map 25).

Other short lines were constructed to provide cheap transportation for mining interests. For many years, beginning in 1882, the Gallup area led in New Mexico's coal production. In 1920 there were eight different spurs leading to coal mines (Myrick 1970:143). Many of the short lines have been dismantled as the coal mines were exhausted.

Mining

When the railroads pushed west they promoted mining by providing cheap transportation of necessary machinery and for bulky, low value products. Also, they became the best customers for such budding industries as the coal mines which fueled the locomotives and the lumber companies which produced ties and bridge building materials. Some mineral exploitation had been going on in New Mexico for centuries but always on a small scale and no great profits had come from it.

Popular legends tell of lost Spanish gold mines throughout the west but historical fact has little support for them. It appears that there were no known gold mines worked in New Mexico prior to the Pueblo Revolt and an official report of 1725 states that not a single gold or silver mine had ever been worked here (Twitchell 1911:II, 177-184). In any event, the study area was never known as a source of mineral riches and even today its mineral wealth does not come from silver and gold but rather from the more prosaic coal and, more recently, uranium.

Most of the study area lies in Valencia and McKinley Counties. Neither county was thought to possess valuable metalliferous ore deposits until the relatively recent discovery of uranium and growth of a market for it. Some copper was discovered near Grants and in the Zuni Mountains but the low tenor of the ore prevented miners from doing much (Anderson 1957:99 and 150). Those portions of Sandoval and Bernalillo Counties which lie within the study area are not known for mineral wealth. One implication of this situation is that the study area contains few of the mining ghost towns which so appeal to amateur historians and collectors.

The first record of coal production was made in 1882 when 164,000 tons of coal were

mined in New Mexico. The industry reached its peak production in 1918 when four million tons were mined. Rapid growth in the coal market was due mainly to its large scale use in smelters. The subbituminous coal from mines near Gallup was used at copper smelters in Arizona and Texas as well as in local markets (U.S.G.S. 1965:101). Initially coal was extracted by drift or inclined slope mines. The mine headframe at Gamarco (Fig. 15) still stands as a reminder that this now quiet town once



Figure 15. Mine headframe and smoke-stack at Gamarco.

was known for its active coal mine. In 1945 the first strip mine was opened near Gallup and that caused an increase in production which reversed a long term trend toward decreased output (*op. cit.*, p. 103).

Towns which grew up beside the coal mines reflect the boom and bust histories of the mines themselves. Initially worked by Slavic miners, Mexicans were recruited in the early 1900s and established a barrio north of Gallup (Beal and Whitmore 1976). Some towns, such as Gamarco, have outlived the local mine and today exist as small residential areas. Others, like Clarkville or Gibson, died when their mines failed (Sherman and Sherman 1975). Copperton and Diener were small mining camps in the Zuni Mountains which lasted only the early years of this century but died when copper mines proved uneconomical.

Uranium mining grew rapidly in importance due to the discovery in the 1950s of large deposits in sandstone and limestone near Grants and Laguna (Hilpert 1969:5). These finds, along with the known reserves of coal, have made New Mexico one of the leading energy states. However, it is too early to consider the historical impacts of uranium on the study area.

Agriculture

Agriculture has had a role in the use of the study area since far back in prehistoric times but the scale of that activity was forced to remain small due to the scarcity of water and the threat of attack by the various non-sedentary tribes who prowled through the region. For much of historic times farmers and herders were confined to relatively small areas near the long established pueblos. Also, Navajo herds of horses and sheep made use of parts of the study area, particularly in the eighteenth and early nineteenth centuries, but estimates of the size of those herds before the Reservation was established would be only guesses.

When the Americans took control of New Mexico the valley of the Rio Puerco (East) was not being occupied, although the ruins of former farms were noted. Lieutenant Abert mapped the upper Rio Puerco but indicated no occupied settlements there in 1846. As explanation, he stated that this was known to have been along the route of a Navajo war trail (Abert 1962:73).

The Navajo Treaty of 1868 made it possible to use the Rio Puerco in relative safety (Lopez 1980:72). Herding, rather than farming, became the important economic activity. Stewart notes that thousands of sheep used the summer pasturage of the Rio Puerco country after 1850 (*n.d.*:222). Already deeply cut into the ground when Abert first saw it, the Rio Puerco channel deepened until irrigation became impractical. Today the valley sees little more human traffic than in Abert's time.

New agriculturalists in the study area were the Mormons who, expanding from their Utah base, were seeking suitable farm lands in the southwest: Ramah and Tinaja were settled in the 1870s. Mission communities also began about this time. Rehoboth grew

from a Christian Reformed Church boarding school and the Baptists built at the site of Mentmore (op. cit.:226-227).

Sheep had played an important role in New Mexico's economy since the early Spanish colonial times. They adapted well to the environment, one which was quite similar to that of their ancestral grazing lands in Spain. They offered the advantage of a marketable wool as well as meat and they gained weight more efficiently than cattle. As noted above, the Navajo often preyed upon the flocks of Pueblo and Spaniard alike and so sheep came to be important to the diet and economy of most people in the area.

Cattle et al. (1977) briefly discuss the way sheep were utilized by the Laguna and investigated archeological sites which are attributed to herding activity. An interesting conclusion in that paper is that best mitigation of sites attributed to Laguna herding was through ethnological, rather than archeological, fieldwork. In fact, much of what was discovered could not have been learned through the use of archeological techniques. For example, the cairns which are common throughout the area were used to mark grazing boundaries and specific features and may sometimes be evidence of nothing more than whimsical behavior. In the absence of ethnographic information the cairns may have been interpreted as mining claim markers or as having some religious significance.

Despite the fact that sheep have long been important there are few sites connected with herding which have been identified in the archeological record. One reason for this is the fact that such sites usually represent a short episode. Another difficulty lies in the fact that herding sites do not have a distinctive artifact inventory. Cattle et al. found that there is only one tool specific to sheepherding, the shepherd's cane (1977:8). Also, sites may be reoccupied either for the original or other purposes.

Lands

The majority of lands not assigned to Indian reservations are now administered by either the U.S. Department of Interior's Bureau of Land Management or by the U.S. Department of Agriculture, Forest Service.

The BLM lands represent all that share of the Public Domain not distributed by the old General Land Office. The forest lands have a complicated history which begins with the establishment of the first Forest Reserves in the area in 1906. Much of the forested lands which might have been included in the original Reserves previously had been granted to the railroad by authority of the Act of 1866. The provisions of the Act which allowed the railroad to claim alternate sections ultimately created a "checkerboard" of privately owned land and federal land. Land exchanges and purchases have gone far toward blocking in the federal ownership of the forested lands so that the checkerboard effect is now much diminished.

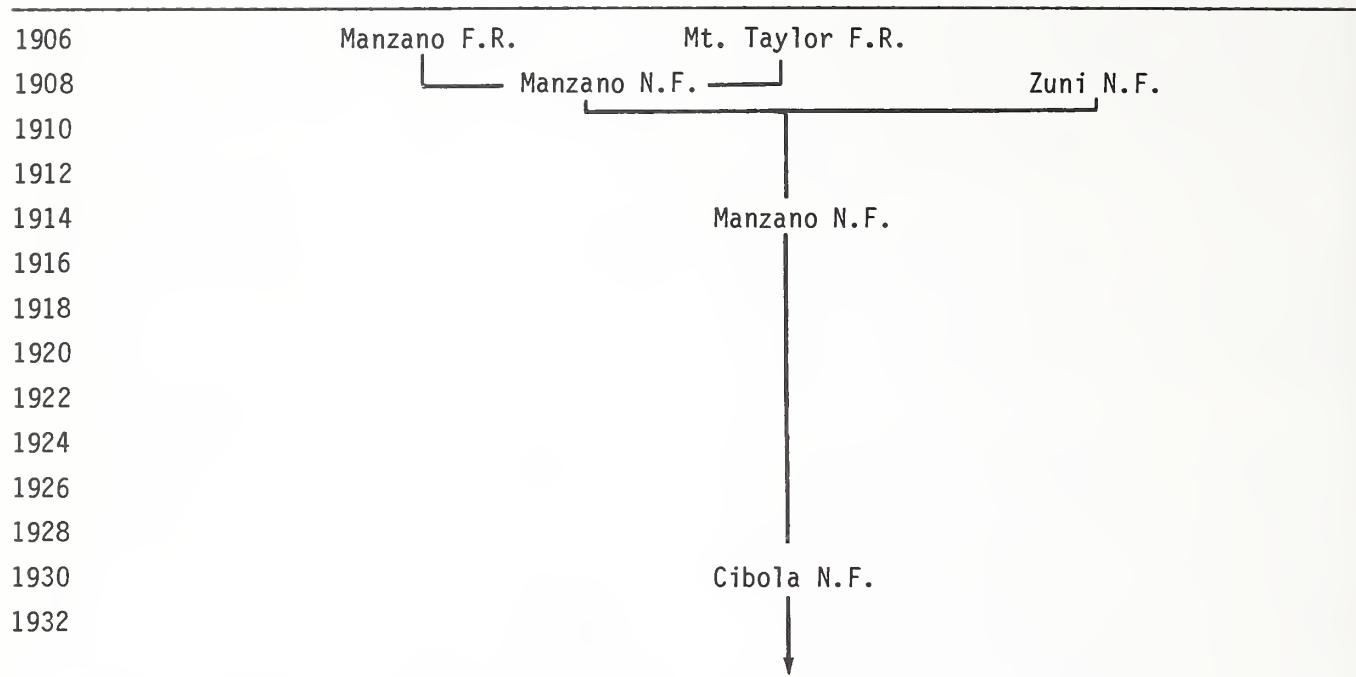
Small amounts of the study area are dedicated to national monument purposes. The National Park Service administers Chaco Canyon and El Morro. The Department of Defense continues to manage portions of the old Fort Wingate military reservation.

The Cibola National Forest came into existence in 1931 but was preceded by other designations of federal forest lands (Table 24). In 1906 the Manzano and Mount Taylor Forest Reserves had been created by proclamation of President Theodore Roosevelt. The Manzano originally was composed of lands east of Albuquerque but a reorganization in 1908 unified the former Mount Taylor and Manzano lands as the Manzano Forest Reserve. In 1909 the Zuni Forest Reserve was proclaimed, having been established from parts of the Zuni and Navajo Reservations. In 1914 this was transferred to the Manzano and the name was discontinued (Tucker 1965).

When the United States acquired New Mexico by conquest all of its lands became government property except those with titles guaranteed by terms of the Treaty of Guadalupe Hidalgo. To further local government, an Organic Act was passed by Congress in 1850 (9 Stat. 446). One provision reserved to the use of the common schools two sections in each Township. Eventually, this resulted in over four million acres becoming the property of the state when those sections were officially granted by the Fergusson Act of 1898 (30 Stat. 484).

Statehood was granted in 1910 by the Enabling Act. This Act also gave the state

Table 24.
Family Tree of the Cibola National Forest



an additional two sections per Township for the common schools as well as other grants of land for other institutions. A total of about twelve million acres was conveyed to New Mexico by the Acts of 1898 and 1910. One section of the Enabling Act provided that the state would disclaim the remaining unappropriated and ungranted lands within the state but that provision has not always been viewed as binding (Vesely 1933:49).

The state found it difficult to collect the lands it was entitled to have because nearly half of the school sections fell on previous grants. There were lieu provisions in the law but it was time-consuming to make the required selections. The state land commissioner adopted the policy of selecting only lands which seemed most likely to be easily sold or leased. Lands within the study area were to be sold for three dollars per acre or leased for three cents, about double the fair market value at that time (op. cit.:51).

Throughout the twentieth century there has been a trend toward increased dedication of land in the study area to private ownership and to growth of Indian reservations. For example, the Navajo Reservation has grown due both to Executive Orders and purchase (Stewart n.d.:235-238) and the Laguna, along with other Pueblos, have purchased additional land for their reservation (Cattle, et al. 1977:22).

The various homesteading laws passed between 1862 and 1916 allowed a man to settle on from 160 to 640 acres. In semi-arid New Mexico even 640 acres seldom proved to be enough land to support a family. As a result, many would-be farmers and ranchers failed and today the ruins of their homes stand in memorial to the victory of climate over ambition, a result which might have been anticipated had the record of the past been read.

MANAGEMENT SUMMARY AND EVALUATIONS

SUMMARY OF THE REGIONAL PREHISTORY

The earliest known human occupation of the Mt. Taylor overview area dates to the PaleoIndian period, between perhaps 9500 and 6000 B.C. The most abundant remains from this period have been found in the eastern portion of the overview area, on the Albuquerque West Mesa and in the Rio Puerco/Rio San Jose drainage system. PaleoIndian sites have also been found around Grants, in the North Plains south of Grants, and on the Acoma Reservation. Isolated PaleoIndian points have been found throughout the overview area, suggesting that actual occupation was more extensive than available information indicates. Cordell (1979:132-134) has suggested that the known distribution of PaleoIndian remains is a function of erosion. She has produced a map showing that areas of the state where such remains are abundant are largely areas where erosion has exposed the ancient land surfaces. This point has important management implications: the fact that PaleoIndian remains are not found in an area does not necessarily mean that early populations did not use the area. It may only mean that erosion has not exposed the remains. Any land disturbing work in an area with a plains-type topography--areas which might have supported herds of grazing herbivores at the end of the Pleistocene--should be monitored to ensure that subsurface PaleoIndian remains are not disturbed.

In the past, the PaleoIndian economy has been thought to have focused on hunting the large megafauna (mammoth and, later, bison) which occupied the area at the end of the Pleistocene. However, it is unknown for any human population outside of the Arctic to concentrate so exclusively on a single faunal resource. In fact, archeological data from the overview area suggest that megafauna would have amounted to only a small fraction of the PaleoIndian diet, with smaller fauna and plant foods making up the bulk. During periods of megafaunal depletion, the population would have subsisted entirely on these other resources. Given the topographic diversity of the overview area, diverse plant and animal resources are distributed in a horizontally compressed fashion, so that they may be conveniently exploited with minimal travel

and transport costs. If this reconstruction mirrors the actual PaleoIndian situation, then foraging settlements dating to this era should be found in diverse locations throughout the overview area. A major problem here is that these settlements may not be currently recognizable because the diagnostic projectile points of the PaleoIndian era may not have been used in exploiting such resources. Cordell (1979:21) has suggested the use of obsidian hydration dating, and the identification of diagnostic tool-making process, to identify such PaleoIndian remains. This should be considered a major research goal.

A second controversy concerning the PaleoIndian occupation of the overview area is Irwin-Williams (1977b) contention that the area was periodically abandoned when megafauna became depleted. She believes that human populations withdrew east to the Plains at such times, where they could continue to hunt bison. During more favorable periods, when megafauna were available in west-central New Mexico, hunting groups would again enter the region. Two problems exist with this. First, if megafauna did indeed comprise only a small part of the local PaleoIndian diet, then during periods of depletion their absence from the diet could have been easily adjusted for, making emigration unnecessary. Secondly, it is unlikely that the occupants of the eastern Plains would have welcomed such intrusions, especially during periods of resource stress. More likely, the overview area supported human populations continuously during the PaleoIndian era, as the results of Judge's (1973) survey suggest.

With the northward migration of climatic zones following the end of the Pleistocene, a number of new conditions presented themselves to human populations in the overview area. The herds of megafauna died out, the climate became warmer and drier, longer growing seasons ensued, and new kinds of ecosystems developed which were, overall, more productive of the kinds of resources useful to foraging populations. The resulting readaptation is known as the Archaic (5500 B.C.-400 A.D.).

Throughout northwestern New Mexico, Archaic populations responded to the new conditions by situating their settlements in areas of

high resource diversity. These were areas of high topographic diversity where several resource zones existed in close proximity, allowing a human group to gain access to seasonally diversified resources from a single settlement. As a result, from early in the Archaic, human populations were largely sedentary. This had important consequences for the later evolution of these populations. Mobile hunting and gathering populations have a built-in mechanism for regulating their numbers: with the high work load involved in transporting both baggage and children, women in such societies consciously space births at intervals of three to five years. But in sedentary situations transport of infants is less of a problem. As a consequence, restrictions on birth spacing are relaxed, and birth rates rise. The result is that sedentary human groups often experience growth of population, slow and perhaps imperceptible in a single lifetime, but significant if continued over long time periods. The sedentary condition of Archaic settlement led thus to growth of population, recognizable throughout the Archaic period in the overview area (Irwin-Williams 1973).

An expanding population inevitably strains its resource base, necessitating shifts toward use of other resources, use of a different settlement system, the development of complex technologies or, in many cases, increase in the complexity of social systems. It has been the position of this overview that such changes follow the Principle of Least Effort. It is expected, under this principle, that the adaptation a human group pursues at any point in time will be the one which meets the subsistence needs of the population at the least cost. If this is so, then it follows that any change in adaptation must be in the direction of adopting new kinds of behavior which require higher levels of effort for the same level of return. Thus, human groups experiencing population pressure will exploit new, more difficult foods, travel farther to obtain these foods, develop more complicated and costly technologies (such as irrigation), or support costly social hierarchies for more efficient organization and distribution of resources. Such trends occurred during both the Archaic and subsequent time periods in the overview area.

The effects of population growth in at least the eastern portion of the overview

area were beginning to be felt by perhaps the time of the San Jose phase (3200-1800 B.C.), resulting in a subsistence shift to increased exploitation of seeds and nuts. This is indicated archeologically by the appearance of grinding tools. In the succeeding Armijo phase (1800-800 B.C.), continued population growth forced the occupants of the Arroyo Cuervo area to plant limited quantities of maize for use as a stored winter food. Coincident with the fall maize harvest, independent Archaic groups began to aggregate into larger groups, on a temporary basis, in order to more equitably share in maize harvests. Complex social and ritual features developed in conjunction with these seasonal aggregations to ensure that variations in each group's maize harvest were evened out by redistributing some of what was available.

A major factor limiting population in hunting and gathering groups is the winter season. With some use of maize, which could be stored over the winter months, this limiting factor was somewhat circumvented. As a result, population continued to grow. Soon, the settlement system had to be expanded to include seasonal camps, and populations in the eastern subarea were forced to shift to major use of a marginal environment, the Albuquerque West Mesa. When even that failed to accommodate the growing population, a major subsistence change was called for. By the Basketmaker III period (A.D. 400-700) populations in the area were forced to shift to major reliance on agriculture. For perhaps several generations, hunter-gatherers and agriculturalists lived side-by-side, trading, intermarrying, and when necessary, competing.

These early agricultural settlements were largely independent and egalitarian. They are found throughout the overview area in locations of suitable agricultural potential. And although many sites from this period have been excavated, we still possess only the murkiest picture of the demographic, social, and economic trends of this important era. And this era was important, for within a few hundred years after the adoption of agriculture there developed in the San Juan Basin a social and economic system of such complexity that it has not been duplicated elsewhere in the Anasazi area, either before or since. This system, which included much of the overview

area, is known as the Chacoan Interaction Sphere.

Among the characteristics of the Chacoan Interaction Sphere were social ranking and a three level settlement hierarchy. At the lowest level in this hierarchy were small, agricultural villages, represented archeologically by the numerous, small pueblos which occur throughout the area. At the local level, groups of these villages were subordinate to second-level settlements, known as Chacoan outliers. These sites are larger, more elaborate, took greater effort to build, often contain sumptuary items, and display architectural similarities to the great houses of Chaco Canyon. They have been interpreted as the residences of local elites. It has been suggested that such elites managed local economies by aggregating and redistributing surplus foodstuffs, ensuring in this way that variations in harvest experienced by local groups were evened out, so that all groups shared equally the risk of resource fluctuations. Such elites probably came to hold their positions by virtue of preferential access to the most productive resource zones, as in the case of the El Rito site in the San Mateo Valley. Other archeologists, however, have suggested that the Chacoan outliers represent intrusions into local areas by groups emigrating from Chaco Canyon.

Chaco Canyon itself, at the center of the San Juan Basin, served as the first-order center in a regional exchange network. It was connected to outlying areas by a network of roads which converged on the canyon. The purpose of these roads was transport of subsistence resources and, perhaps, people around the San Juan Basin. Segments of such roads may exist in the overview area in the San Mateo region and in the Rio Pescado/Rio Nutria portion of the Zuni Reservation.

The Chacoan Interaction Sphere, the structured settlement hierarchy, and the road system existed for the purpose of organizing economic exchange between San Juan Basin communities and surrounding populations. The San Juan Basin is a relatively homogeneous feature without substantial topographic relief. Areas on the periphery of the basin, in contrast, are characterized by marked altitudinal variation. This being the case, groups in both settings could gain access to a wider

range of resources than those locally available by engaging in reciprocal trade relations. Such trade relations began early, by at least the Basketmaker III period. As population continued to grow, a point was reached where reciprocal, egalitarian trade was not sufficient to buffer the variations in harvest experienced by local groups. A managerial elite subsequently developed to serve the needs of an expanding trade network. Given its central location in the San Juan Basin, Chaco Canyon emerged as a first-order center, serving as a location from which resource surpluses could be concentrated and dispersed.

That this system did not function perfectly is indicated by the fact that, ultimately, it failed. The Chacoan outliers came to be abandoned, perhaps earlier in the overview area than elsewhere. The reasons for the collapse are unknown. Equally elusive are the reasons why the San Juan Basin, including the northern part of the overview area, was abandoned by 1350 A.D. After this date, populations in the overview area concentrated in the Zuni, Acoma, and Laguna regions, and along the lower Rio Puerco of the east.

The southern portion of the overview area did not participate as fully in the Chacoan Interaction Sphere as did the northern portion. Instead, their focus of interaction was with populations to the south. These contrasting foci of interaction--the northern overview area with populations to the north, the southern area with populations to the south--resulted in a situation where the overview area came to be characterized by two generalized archeological patterns, the Anasazi pattern in the northern part and the Mogollon pattern in the southern. Thus, the overview area is recognized archeologically as having contained the boundary zone between these two entities. The reason why this boundary is located in this area may be related to trade patterns, and the integration of ecological diversity. Populations on the southern margin of the San Juan Basin (the northern part of the overview area), with access to higher elevation resources, could profitably trade with populations occupying different kinds of terrain, the ecologically more homogeneous San Juan Basin to the north. Trade between such regions would have the effect of uniting ecologically diverse territories. But such

populations on the southern edge of the San Juan Basin would gain little advantage from interacting so intensively with populations to the south, populations which occupied similar high diversity ecological settings. Thus, a boundary resulted, dependent entirely on the focus of trade networks. By interacting with populations to the north, the northern overview area came to share material features with these populations, and developed an archeological record recognizable as Anasazi. Southern overview populations, whose resources were superfluous to the San Juan Basin (and too distant, in any case), came to share material similarities with Mogollon populations to the south.

SUMMARY OF THE REGIONAL HISTORY

Since 1539 the study area has been administered by Spain, Mexico, or the United States. Even as the Spanish entered the area, Athapaskan peoples were drifting south to claim the same land. The stage was being set for the conflict of cultures based on disparate economies, religions and governments. Much of the history of the study area is the story of that conflict. Only after the American Civil War did lasting peace come with attendant population growth and economic advances.

MANAGEMENT DISCUSSION

I will concentrate in this section on two topics: 1) research problems which, on the basis of the foregoing synopsis, appear to be amenable to solution in the overview area, and 2) general issues related to the conservation of cultural resources.

Research Problems In The Overview Area

Bearing in mind a point raised earlier in this document, that the ultimate goal of archeology is to study and resolve questions of human behavior which are general in their occurrence, not bound by time or space, the cultural resources of the overview area can potentially be used to address a number of topics. Based upon this overview, I believe the following topics should receive research priority in the region, at least until such time as

changes in archeological theory bring other questions to the forefront.

- 1) Demographic trends in the area through all time periods.
- 2) The degree of diversity in PaleoIndian settlement and subsistence in west-central New Mexico.
- 3) The nature of the PaleoIndian/Archaic transition.
- 4) The selection of high diversity locations for Archaic settlement.
- 5) The late Archaic shift to use of maize, seasonal aggregation, increased social and ritual complexity, and occupation of marginal resource zones.
- 6) The role of late Archaic maize cultivation in alleviating winter scarcity, and consequent population trends.
- 7) The Basketmaker III shift to major reliance on agriculture.
- 8) The coexistence and interaction of hunter-gatherers and agriculturalists in the early agricultural era.
- 9) Patterns of social change in the agricultural era, between Basketmaker III and Pueblo III.
- 10) Patterns of regional exchange in the agricultural era.
- 11) The structure of Chacoan social, political, economic, and settlement hierarchies.
- 12) The origins of social ranking reflected in the Chacoan outlier phenomenon.
- 13) The phenomenon of aggregation.
- 14) The decline of the Chacoan Interaction Sphere.
- 15) The abandonment of various portions of the overview area.
- 16) The relationship between the Anasazi/Mogollon boundary and the integration of ecological diversity through trade.

It should be stressed that this list is only a fraction of the research topics

which can be identified concerning the overview area. Questions concerning such things as classification and chronology, local-level organization and exchange, subsistence and settlement, technological change, and the like, present topics for investigation which, in combination, are endless. Research in the region can profitably concentrate in any of these areas.

Conservation Of Cultural Resources

The question of conservation of cultural resources revolves ultimately around the question of significance under the eligibility criteria of the National Register of Historic Places (36 CFR 60.6). Cultural resources which meet the significance criteria legally merit consideration for conservation, whether preservation or some mitigative measures. The issue of how significance is to be evaluated is of the utmost importance, for in many cases the archeological record which will be available to future generations is being decided today. Rather than address this point in terms of preserving particular kinds of sites, I will raise some general concerns which supercede more detailed discussions.

I pointed out in an earlier chapter that the assumptions, questions, and goals of scientific disciplines change. This is, as Kuhn (1962) has pointed out, apparently an inevitable outgrowth of the process of scientific inquiry. Archeology is no exception. It has undergone shifts in orientation in the past, and will do so again. This point has far-reaching management implications; unfortunately these have been little recognized in the literature on the subject. The management implications may be simply put: with changing research goals, archeology will in the future come to recognize as important different kinds of archeological remains from those we recognize as important today. Naturally, such changes are unpredictable.

This process has occurred in archeology and cultural resource management in the past, and a simple example will serve to clarify the concerns expressed here. When archeology was concerned with producing normative generalizations, the focus was on excavating sites which would provide the most data relevant to that concern. These tended to be sites which were large or deep or particularly rich in artifacts, for such

sites contain abundant archeological traits, from which normative inferences were drawn. Smaller, low density sites, with fewer traits, were considered less important, less "significant," and were often not even recorded. Yet today, archeology has become concerned with other topics, with questions of how past peoples used the landscape, with patterns of subsistence and settlement. For such concerns, small, low density sites are of the highest "significance," for these are the kinds of remains left behind by foraging activities.

One can imagine the situation archeological research would be in today if the only sites remaining were the ones judged significant and preserved by archeologists of 20 or 30 years ago. Quite bluntly, archeology would be a stagnant discipline, unable to change and grow. But we often overlook the fact that the same consideration applies equally to the preservation decisions we make today, for these will affect archeology not only for the next decades, but forever. In recognition of this problem, Lipe (1974) has suggested establishing archeological preserves where representative samples of the main varieties of archeological remains could be protected. However, Lipe does not seem to realize that, as research goals change, so also will the bases of archeological classification. Future archeologists will probably view the archeological record differently, they will classify it differently, and their ideas about what the "main varieties" of sites are cannot be anticipated.

Archeologists, like all individuals, vary in their perception, training, creativity, and foresight. Thus, it is incumbent upon us to realize that an evaluation of a site's "significance" may prove to be useful to only some archeologists, and more important, for only a short time. By and large, a statement that a site is not significant today becomes a condemnation of the site, with the clear implication that it will never be significant. And if such a site is subsequently destroyed without any mitigative action, the loss to knowledge is permanent. Multiply such individual decisions many thousand times, and the attrition to the archeological record becomes devastating. Truly, then, the very existence of an archeological data base for the future is in jeopardy. In failing to

recognize this fundamental fact archeological management has been appallingly shortsighted. The results of this shortsightedness are deplorable today; in the next century they may become tragic. Attempts to develop contemporary criteria for evaluating sites, such as regional research designs and state plans, may thus inadvertently become the vehicles by which the growth of archeology as a research science is brought to an end. If cautious, conservative, yet farsighted decisions are not made today, then we will unwittingly create a situation where future archeologists will be forced to investigate those kinds of sites which we appreciate as important. Surely no archeologist would argue that all future research should be frozen at the level achieved in the late 20th century. Yet our preservation decisions may have precisely that effect!

I am firmly in agreement with Dixon when he states that "All archeological resources have potential significance unless proved otherwise" (1977:287). The burden of proof thus rests upon those who deny significance to a site. This being the case, when a

site cannot be positively demonstrated to lack research potential, negative significance evaluations cannot, and should not, be made. State plans, regional research designs, and other contemporary evaluative criteria can never be used as a basis for excluding a site from conservation. This does not mean that every archeological resource must be preserved in the ground. It only means that we must be careful that future archeologists will have the data they will need. If those data can be removed from their place of deposition without major information loss, then fine.

What is clearly called for is to manage cultural resources in a spirit of stewardship for not only the present, but for the future. This is nothing new. Federal agencies were directed by Executive Order 11593 (signed May 13, 1971) to administer the cultural resources under their control in just such a spirit. Yet still today this spirit seems to be sadly--and indefensibly--lacking in archeological management. I believe that developing such a spirit is the major problem confronting cultural resource managers today.

APPENDIX A

INFORMATION SOURCES FOR THE OVERVIEW AREA

The following are sources which were found useful in preparing this overview, or which may potentially prove useful. Nearly all of the sources listed below were consulted.

University of New Mexico

1. Maxwell museum of Anthropology

- collections and documentation from University projects in the study area.

2. Office of Contract Archeology

- clearance and mitigation reports from study area.

New Mexico State University, Las Cruces, Cultural Resources Management Division

- clearance reports from study area.

New Mexico State University, San Juan Campus

- clearance reports from study area.

Eastern New Mexico University

- collections, fieldnotes, and manuscripts from Cynthia Irwin-Williams' research in the Rio Puerco area

- documentation for clearance survey of West Mesa airport.

San Juan County Archeological Research Center and Library

- collections, fieldnotes, manuscripts, and clearance reports from work in the San Juan Basin.

Laboratory of Anthropology, Museum of New Mexico

- collections, fieldnotes, and manuscripts from more than 30 years of archeological management in the area, including the highway salvage program and contemporary clearance and assessment reports

- extensive file of cultural resources recorded in the area.

School of American Research

- documentation pertaining to contracted research in the area.

Gallup Archeological Society

- documentation pertaining to excavations in the vicinity of Gallup.

Albuquerque Archeological Society

- documentation and reports pertaining to excavations in the Rio Puerco drainage.

Cibola National Forest

1. Supervisor's Office

- file of all information pertaining to archeological management on the Mt. Taylor Ranger District.

2. Mt. Taylor Ranger District

- file of historical photographs from the district.

Bureau of Land Management, Albuquerque District

- file of all information pertaining to archeological management on the district.

Bureau of Land Management, Socorro District

- file of all information pertaining to archeological management on the district.

Bureau of Indian Affairs

- file of information pertaining to archeological management on the Zuni, Acoma, Laguna, and Ramah Navajo Reservations

- documentation for timber sales survey program.

Zuni Archeology Program

- file of information pertaining to archeological management in the Zuni area

- documentation for study of Zuni farming villages

- collection of reports documenting research in the Zuni area, including the Cibola Archeological Project and the Yellowhouse Dam Survey.

National Park Service

1. Southwest Cultural Resources Center, Santa Fe

- San Juan Basin Archeological Data Base Project

- file of documentation on the Zuni area.

2. Division of Cultural Research, University of New Mexico

- documentation pertaining to the Chacoan outliers.

3. Division of Remote Sensing, University of New Mexico

- remote sensing data for San Juan Basin, El Morro National Monument, and Zuni area.

4. El Morro National Monument

- library and historical photographs pertaining to area.

U.S. Army Corps of Engineers

- documentation for archeological management in the Rio Puerco of the east.

New Mexico State Planning Office

- critical areas survey.

New Mexico Historic Preservation Program

- documentation regarding cultural resources management

- documentation pertaining to restoration work at San Esteven del Rey Mission (Acoma)

- documentation pertaining to Chacoan outliers.

Center for Anthropological Studies

- documentation pertaining to clearance investigations on the West Mesa and near Mt. Taylor.

Public Service Company of New Mexico

- documentation pertaining to Chacoan outliers

- documentation pertaining to Seboyeta Pumped Storage Facility.

Sources which it was not possible to consult, or that did not respond to inquiries, but which may prove useful, include these:

Peabody Museum, Harvard University

- documentation pertaining to archeological work in the Cebolleta Mesa area.

University of Arizona

- documentation pertaining to archeological work in the Cebolleta Mesa area.

Arizona State University

- documentation pertaining to archeological work in the Cebolleta Mesa area.

Wake Forest University

- documentation pertaining to archeological work in the Ramah area.

Navajo National Cultural Resources Management Program

- documentation pertaining to archeological management on Navajo lands.

In addition, a survey conducted by New Mexico State University (Magers n.d.) revealed that the following institutions possess collections from the Zuni-Acoma area.

- Colorado Historical Society

- El Morro National Monument

- Museum of the American Indian

- New Mexico State University

- Museum of Anthropology, University of Michigan

- Dartmouth College

- Mesa Verde National Park

- Northern Illinois University

- National Park Service Western Archeological Center
- U.S. National Museum
- Historic Zuni and Laguna materials in museums in Austria, England, Germany, the Netherlands, France Italy, Denmark, Belgium, Finland, Norway, Scotland, Sweden, and Switzerland.

APPENDIX B

REGISTERED CULTURAL PROPERTIES IN THE OVERVIEW AREA

NEW MEXICO STATE REGISTER OF CULTURAL PROPERTIES (as of August, 1979)

Bernalillo County

Albuquerque

Boca Negra Cave Site
Indian Petroglyph State Park

McKinley County

Coolidge

Coolidge Archeological Site

Fort Wingate

*Fort Wingate Historic District
Fort Wingate Ruin

Gallup

*Cotton House
Harrison House
Village of the Great Kivas

Gamerco

Gamerco Mine Smokestack

Haystack

Haystack Archeological District

Manuelito

*Manuelito Archeological Complex (NHL)

Prewitt

Casa Mero Archeological District
Casamero Ruin
Coyotes Sing Here Archeological
District

San Mateo

Kin Nizhoni Archeological District

Zuni

Heshotauthla Ruin
Kwa'kin'a Ruin
Kyaki:ma Ruin
Soldado Ruin
Yellow House Ruin
*Zuni-Cibola Complex (NHL)
Zuni Dam
Zuni Mission Church of Nuestra Senora
de Guadalupe de Halona
*Zuni Pueblo

Sandoval County

Casa Salazar

*Big Bead Mesa (NHL)

Guadalupe

Guadalupe Historic District

Laguna

Canon de Juan Tafoya (Town of Marquez)
Masonry Dam of the Rio Puerco

Valencia County

Acoma

*Acoma Pueblo (NHL)
*San Estevan de Acoma Mission Church
(NHL)

Agua Fria Springs

Fort Wingate-Zuni Wagon Road

Cebolleta

Cebolleta Ruin
Los Portales

El Morro

Cienega Ruins
*El Morro National Monument &
Collections
Pueblo de los Muertos

Grants

*Dittert Site

Laguna

Correo Snake Pit & Collections
*Laguna Pueblo
*San Jose de la Laguna Mission and
Convento

Los Lunas

Pottery Mound

Ramah

Gigantes Ruin

San Mateo

*San Mateo Archeological Site

Zuni

*Hawikuh Ruin (NHL)
Kechiba:wa Ruin
T G & E Route Archeological Sites
*Zuni-Cibola Complex (NHL)

*National Register of Historic Places
NHL National Historic Landmark

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Abbreviations have been used in this bibliography for seven of the most commonly cited organizations which produce reports or other kinds of studies within the study area.

OCA - Office of Contract Archeology, University of New Mexico, Albuquerque.

LA - Department and/or Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

SAR - School of American Research, Santa Fe.

USFS - USDA Forest Service, Southwestern Region, Cultural Resources Management (Reports).

Portales - Department of Anthropology, Eastern New Mexico University.

Zuni - Zuni Archaeology Program, Zuni.

BIA - Bureau of Indian Affairs, Albuquerque.

NMSU - Cultural Resources Management Program, New Mexico State University, San Juan Campus.

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